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ABSTRACT

The Nursing Home Research Study is concerned with the quantitative measurement of nursing service in nursing homes. The purpose of the project was to provide data needed to establish a basis for proposing minimal staffing patterns for nursing homes. In an adaptation of the methodology used in a study conducted by the Milwaukee, Wisconsin Health Department in 1962-63, nurse observers collected data by observing the nursing care of 195 sample patients in 14 nursing homes located in the Denver Metropolitan area during the period November 5, 1965 to April 17, 1966. The data were obtained on the number of specific nursing activities completed in 24 areas of nursing care; the time required for the categorical levels of nursing personnel to perform these activities for patients with minimal, moderate, or maximum nursing needs, ambulatory and nonambulatory; the distribution of personnel by shift; and the characteristics of the patients residing in the homes. These data will be invaluable in judging proposals for establishing guidelines for staffing of nursing homes. (Author/DB)

NURSING RESEARCH HOME STUDY

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Quantitative Measurement of Nursing Services

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NURSING HOME RESEARCH STUDY

Quantitative Measurement of Nursing Services

Prepared by
Eleanor M. McKnight, RN, B.S., M.P.H.
Project Director

October 1970

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
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Foreword

The Nursing Home Research Study is concerned with the quantitative measurement of nursing service in nursing homes. The study was conducted by the Colorado State Department of Public Health under contract with the Division of Nursing, now a component of the Bureau of Health Manpower Education, National Institutes of Health.

This study was undertaken because of the urgent need to maintain and extend quality nursing care to the rapidly increasing aged population in this country. Data were needed that would provide a factual basis on which to propose minimal staffing patterns for nursing homes. The purpose of this project was to provide such data.

In an adaptation of the methodology used in a study conducted by the Milwaukee, Wisconsin Health Department in 1962–63, nurse observers collected data by observing the nursing care of 195 sample patients in 14 nursing homes located in the Denver Metropolitan Area during the period of November 5, 1965 to April 17, 1966.

The data were obtained on the number of specific nursing activities completed in 24 areas of nursing care; the time required for the categorical levels of nursing personnel to perform these activities for patients with minimal, moderate, or maxmium nursing needs, ambulatory and nonambulatory; the distribution of personnel by shift; and the characteristics of the patients residing in the homes. These data will be invaluable in judging proposals for establishing guidelines for staffing of nursing homes.

Acknowledgment is made to the Milwaukee Health Department for the use of their methodology and particularly to Miss Gertrude Mulaney, R.N., Public Health Nursing Superintendent, for her continuous cooperation and advice.

Jessie M. Scott

Jessie M. Scott
Assistant Surgeon General
Director
Division of Nursing

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Introduction

In the decade of the 1950's, the aged population of the United States increased by nearly 35 percent; in contrast, the total population increased only 18.5 percent. Data from the decennial censuses of 1870 through 1960 reveal that the percentage of this component of the total population rose from 2.9 in 1870 to 9.2 in 1960, an increase of 217 percent. Projected figures by the U.S. Bureau of Census showed approximately 9.5 percent of the total population were 65 or more years old by 1970.

There has been a great amount of concern for the so-called "senior citizens" of our society for a number of years. The White House Conference on Aging in 1961 met to consider and propose solutions for the problems and dislocations created for individuals, families, communities, and society by the rapid increase in numbers of the older population. The Special Committee on Aging, United States Senate, has also been studying various aspects of the needs of older people for some time. Subcommittees were appointed to focus on particular problems such as income, housing, health, and long-term care of the chronically ill. The urgency and magnitude of the problems were demonstrated by the investigations and recommendations for enactment of Federal legislation as a means of alleviating the unmet needs of this part of our society.

The rising cost of medical care, the difficulty of financing adequate care on limited incomes, the need for special facilities such as nursing homes for long-term care of the chronically ill, the need for other health facilities serving the special needs of older people—all of these have been of grave concern to those in the health professions.

A new program of health care for the elderly (Medicare) was enacted as part of the Social Security Amendments of 1965 (Public Law 89–97). A section of this law provided for care in "extended care facilities," the majority of which are the nursing homes. The implementation of the health care legislation added impetus to the already existing need to develop adequate standards to insure safe, quality care in the nursing homes. Under the legislation, conditions for participation of facilities in the health insurance program were developed for use in certifying facilities for such participation. These conditions included the requirements set forth in the statute and the additional health and safety requirements prescribed by the Secretary of Health, Education, and Welfare.

Need for Project

There were several provisions in Public Law 89–97 of particular applicability to nursing homes and other long-term care facilities. The law repeats and reaffirms the previously existing statutory requirement that there be a State authority responsible for establishing and maintaining standards for private or public facilities providing long-term care. In the past, standards of care were developed by various agencies and organizations; i.e., State licensing agencies, national organizations both professional and industrial, and accreditation agencies. Inherent in the development of the standards has been the difficulty in defining staffing. Since nursing constitutes the largest component of services rendered in nursing homes, it appeared imperative that ways be found to define appropriate standards for nursing practice and to develop guidelines for staffing patterns.

What factors influence or determine the number of nursing personnel, the categories of nursing personnel, the administration and supervision of nursing staff, the necessary equipment and supplies that are needed to meet the nursing care requirements of the patients?

Unfortunately, Medicare legislation and the resulting increase of potential candidates for nursing home care has not been accompanied by an increase in properly prepared personnel or maximum use of the existing personnel. This further points out the need for an intensive effort to improve the

present staffing patterns in the nursing homes if the effectiveness of nursing services is to be maintained rather than endangered.

Most of the development of staffing guidelines in the past was done in and for hospitals. These guidelines are not applicable to nursing homes and long-term care facilities because of the difference in emphasis in patient care. Hospitals are concerned primarily with the acutely ill patient and nursing homes are concerned primarily with the chronically ill patient.

Data were urgently needed to provide a sound basis for establishing minimal staffing patterns for nursing homes: data relevant to the problem, well defined, and authentic; data that would enable responsible persons to develop guidelines for staffing in the long-term care facility. In addition, the data would provide information to be used by regulatory agencies in formulating standards for staffing (both quantitative and qualitative) for patient care and also information on the characteristics of the patients residing in these facilities that would be used as a possible index to determine requirements for care.

Purpose of Project

A study conducted by the City of Milwaukee Health Department in 1962–63, supported by a grant from the U.S. Public Health Service under the provisions of the Community Health Services and Facilities Act of 1961, developed an approach that appeared to the Division of Nursing, U.S. Public Health Service, to have outstanding potential for securing data needed for staffing recommendations. The general objective of the Milwaukee study was:

> to determine the actual amount of time used by nursing personnel in providing nursing service to a random sample group of ambulatory and non-ambulatory (bed/chair) patients living in fourteen selected nursing homes in the City of Milwaukee.(1) [1]

Two basic instruments were developed for collection of the data in the Milwaukee Study. One was the Observer Record, which included 24 nursing service areas and one miscellaneous area. Each of the nursing service areas was divided into "activities" relating to the area and listing the procedural steps considered essential to assess the completeness of the activity. Each procedural step was observed and checked as either "taken," "not taken," or "not applicable." The procedure was recorded as to the patient receiving it, the staff personnel giving it, and the time taken to complete it. The second instrument was a Patient Profile, which included sociological data, a diagnostic description, the current medical orders, and an evaluation of the patient's mental and physical abilities and limitations. Data collected by use of these two instruments were used to meet the nonspecific objective as follows:

(1) To identify the nursing procedures that were used in patient care;
(2) To obtain the average time actually used in performing the specific nursing activity;
(3) To obtain average nursing care time over a 24-hour period for ambulatory and non-ambulatory (bed/chair) patients;
(4) To obtain average nursing care time for all patients according to the individual nursing home.

Statisticians knowledgeable in nursing studies, in the development of staffing guidelines, and in the operation of nursing homes, recommended replicating(2) the Milwaukee methodology. The purpose, then, of this project was: (1) to show that data collected by such an approach could provide a factual basis on which to propose minimal staffing patterns; (2) to test the validity, reliability, and capability of the method for extension to all types of nursing homes including homes comparable to those in the Milwaukee study plus some that were larger and some that were located in a relatively rural area.

The object of the purposive sample was to ascertain (1) to what extent varied settings of nursing homes are reflected in the time it takes to perform the activities in the 24 nursing care areas observed in the Milwaukee study; (2) if there are difficulties in the use of the Observer Record in the nursing care areas, activities, and procedural steps, and in the use of the Patient Profile record; and (3) whether modifications are necessary due to variables such as geographical setting, size of facility, composition of personnel providing nursing care, and patient characteristics.

[1] Numbers in parentheses refer to literature cited, p. 21.

Organization

The initial planning meeting for the project was held in Washington, D.C., on March 25 and 26, 1965. The meeting was attended by representatives from the Division of Nursing, U.S. Public Health Service; representatives from the Nursing Homes and Related Facilities Branch, U.S. Public Health Service; the Superintendent of Public Health Nursing, Milwaukee City Health Department; and a representative from the Nursing Section, Colorado State Department of Public Health. These persons represented the fields of nursing and nursing research, and the area of nursing homes and related facilities.

Discussion during this meeting centered around (1) the Milwaukee study (methodology, problems, results, and recommendations); (2) the feasibility of replicating it in Colorado; (3) the means of strengthening the potentiality of the data; (4) additional criteria for selection of nursing homes in Colorado; (5) elements to be included in a contract plan with the Colorado State Department of Public Health; and (6) procedures for negotiating the contract.

The consensus of the group was to do the replication for the purpose of testing the methodology; and to do the study in the same number of nursing homes (14) as in Milwaukee, using the same criteria [2] for selection, plus:

(1) Eliminating homes in which a professional registered nurse functions in the dual capacity of nurse and administrator;

(2) Eliminating *new* nursing homes in which the nursing service was not well established and/or the quality of nursing service is unknown;

(3) Selecting homes in the city of Denver, Metropolitan Denver, and rural areas adjacent to the city of Denver.

It was further decided that the data be processed by computer rather than hand tabulation as done in Milwaukee; and that information on individual personnel in each home be coded for possible future analysis rather than using only a categorical designation. It was also suggested that the patient in each sample group be cared for by as few numbers of nursing staff as possible during the observation period.

It was requested that a listing of Denver area nursing homes meeting the criteria be compiled; these homes were to comprise the population from which the sample would be selected. The compilation included the following informational items: address; bed capacity, ownership classification (proprietary or nonproprietary); percentage of occupancy for the past year; population of the area in which they were located; area classification (city, metropolitan, or rural); and the level of the nursing staff (RN or LPN) employed on the three shifts. The listing yielded a total of 47 homes from which to select the sample of 14. The decision was made that the sample would be developed in Washington, after first obtaining the nursing homes' willingness to participate in the study, which would be cleared locally in Colorado.

In the interim of the March meeting and August 1965, the contract was finalized between the Colorado State Department of Public Health and the Division of Nursing, U.S. Public Health Service. The Project Director, assigned to the project from the Nursing Section, Colorado State Department of Public Health, was to spend 100 percent of her time on the project.

On July 14, 1965, the administrators and nursing supervisors from the 47 nursing homes eligible for participation were invited to attend a meeting at the office of the Colorado State Department of Public Health. The Project Director acquainted them with the purpose and method of conducting the project and, following the discussion period of questions and answers, all of those present indicated a willingness to participate. Those who were unable to attend this meeting were contacted both by letter and telephone, and their response was also affirmative.

The contract became effective on August 15, 1965, for a period of one year.

The project staff [3] consisted of Supervisor of Observers, seven Nurse Observers, a Statistics Consultant, and a Secretary. The Supervisor was to be

[2] See under "Methodology," p. 5.

[3] Qualifications of Project Staff, appendix, p. 30.

employed full time for a part of the year; the Nurse Observers, full time for the period of data collection; the Statistics Consultant, part time for the year; and the Secretary, full time for the year. Recruitment of the staff, with the exception of the Secretary, was completed by October 1965. Unfortunately, a full-time Secretary was not secured until February 1966.

The Consultant Committee met with the Project Director at regular intervals throughout the project period. Members of this committee were the Project Officers and other representatives from the Division of Nursing, U.S. Public Health Service; and representatives from the Nursing Homes and Related Facilities Branch, U.S. Public Health Service. This committee functioned as an administrative, consultative, and advisory group for the project.

In addition to the Consultant Committee, consultation was obtained from the Director of the Milwaukee study regarding the methodology, the qualifications of the staff, the research instruments, and sampling procedures, plus specific difficulties to avoid in the replication in Denver.

The 14 nursing homes chosen as the sample group were notified, and subsequent meetings with their representatives were held singly and in a group. They were oriented in detail to:

(1) The observation procedure in the homes;
(2) the number of patients to be observed and the manner in which they would be selected;
(3) the qualifications of the nurse observers and their functions as observers;
(4) the length of the observation period in their homes;
(5) suggested ways of orienting their staff and patients to the project;
(6) the confidentiality of information collected and published.

Dates were established for data collection, making every effort to meet the individual nursing home preferences.

The sample of nursing homes was purposive rather than random, because it was the intent in this project to:

(1) repeat the study in a setting similar to Milwaukee;
(2) extend the power of the analysis of the data in order to reduce the variability in the amount of time used to perform the different areas of nursing care found in the Milwaukee study.

The Denver Metropolitan area was chosen because of its similarity to Milwaukee in population, and also because there were nursing homes comparable to those in the previous study, plus some that were larger and some that were in a relatively rural setting. The metropolitan area included five counties contiguously located to the city of Denver. These counties are socially and economically associated with the city.

A 2-week session of orientation and preparation of the project staff was held from November 1 to November 12, 1965. The first week was an introduction to the project, its methodology and the instruments to be used for collection of data; to their responsibilities as observers; to the coding of the Observer Record; to the assignment schedule; and to the personnel policies for the project. The second week was used for practice observations in a nursing home not included in the study. Each observer had the experience of observation on each of the three shifts.

Observations began on November 15, 1965, and were completed on April 17, 1966, with one interruption from December 20, 1965, to January 3, 1966. The nursing homes, along with the Project Director and the Consultant Committee, felt that nursing services would be affected by the extra activities prevalent during the holiday season.

Methodology

NURSING HOME SAMPLE

The universe of 47 nursing homes from which the sample of 14 homes was selected was located in the Denver Metropolitan area of Colorado. The criteria for the universe were the same as those used in the Milwaukee study, namely:

- Maintains an average daily census of at least 24 patients;
- Must have a registered professional nurse in charge of nursing service on at least a 40-hour per week basis (This nurse is not responsible for the duties of administrator.);
- Must have been observed to be well-staffed on previous health department inspections through meeting a close approximation of the recommended minimum for nursing hours;
- Must have indicated willingness to participate in the project;

plus the additional criteria previously mentioned on page 3 under Organization.

In the development of the purposive sample of 14 homes from the universe, additional specifications were used. These specifications were:

- Must include 14 homes;
- Must include five homes in city area of Denver;
- Must include three homes in the greater Metropolitan Denver area;
- Must include three homes of size larger than 91 beds;
- Must include three homes in the rural area;
- Must include proprietary and nonproprietary homes;
- Should include homes of 75 percent plus occupancy;
- Should include city homes of both sizes, fewer than and more than 91 beds.

The sample ultimately chosen was five homes in the city area; three of size fewer than 91 beds and two of more than 91 beds; six homes in the metropolitan area, three of size fewer than 91 beds, and three of more than 91; and three homes in the rural area, two of size fewer than 91 beds, and one of more than 91.

PATIENT SAMPLE

A random sample of patients was chosen from each of the 14 homes in the project. The patient sample size varied with the size of the home, but was never fewer than six nor more than 24. Five homes had a sample size of six; three homes had a sample size of 12; three homes had a sample size of 18; and three homes had a sample size of 24; with a total patient sample of 192.

The sampling procedure for the patient sample necessitated a floor plan of each nursing home, showing the location of patient beds in each room, and physical arrangements of nurses' stations, bathroom facilities, utility rooms, and any other physical facility that might influence the patient observation areas. Patients in groups of threes were to be observed by one nurse observer, thus making the floor plan essential to accurate data collection. Each home was visited and floor plans were very carefully and completely drawn in detail.

The sampling procedure began by identifying "key" patients who occupied the middle bed of the observation area of three occupied beds. Random selection of the "key" patient was accomplished in the following manner: All patients in the home were assigned numbers from one to the highest number of the census. Since all of the nursing homes had corridors (or room arrangements that could be adapted to this sytem), patient number one was always the first patient on the left side of the corridor nearest to the main entrance of the home or of the floor in multi-level homes. Patient number two occupied the contiguous bed in clockwise succession to patient number one. This system continued until all patients on that side of the corridor had been numbered. The numbers commenced again with the patient in the nearest bed across the corridor, and the numbers were continued until the last patient received the last number.

The "key" patients were chosen by lot (table of random numbers); the observation unit consisted of the "key" patient, the patient to his right and the patient to his left. Thus, the requirement that each patient in the home have an equal chance of being included in the study was maintained. Each patient had an equal chance of being a "key"

patient or of being situated to the right or left of a "key" patient. The elaborate numbering system insured that the last and the first patients would have such an equal chance with the others.

On the basis of the above consideration, the following sampling procedure was employed. Three patients were selected from the first home selected and these were observed around the clock for the first 3 days of the week. Then three additional patients were selected and observed for 3 days of the week preceding Sunday. On Sunday, the first set of three patients were observed for the first 12 hours and the second set of three patients for the remaining 12 hours.

In practice, of course, some expected variations in the procedure could become necessary by structural location, death, or discharge of patients. Replacement of patients was made by the following methods:

A. "Key" patient: Replaced by the next patient in clockwise succession, unless this patient was so situated that the observer would be unable to conveniently view his area; in this case the replacement was the patient in counter-clockwise succession. If this method did not meet the need, an alternative plan was selected by the Director, Supervisor, and Statistician.

B. Patients other than "key" patient: Replaced by the patient who was next in relation to the "key" patient as was the discharged or deceased patient, unless this patient was so situated that the observer would be unable to conveniently view his area; in this case an alternate patient was selected by the supervisor with consent of the Director.

STUDY INSTRUMENTS

Two basic tools were used for collection of data—the Patient Profile form and the Observer Record form.[4] They were essentially the same as originated by the Milwaukee study, with limited modifications in format necessary for computer processing. All content of the original forms remained. Deletions were not permitted; however, additions were acceptable.

The patients were described by use of the Patient Profile form. A Profile was completed for every patient, sample and otherwise, residing in the nursing home during the period of observation. The Profile provided a source of statistical data from information regarding the diagnostic description, medical orders, nursing orders, identifying social data, evaluations of the patient's mental and physical abilities, adjustment limitations, and socialization potential. The information on the Profile Record came from three sources: the patient record, observation of the patient, and discussion of the patient with the nursing personnel responsible for care of the patient in the nursing home.

Evaluation of the patient's nursing need and ambulation classification was derived from the recorded information on the Profile and from the use of specific definitions and criteria.[5]

The ambulation classification of patients was the only classification used during the data collection period in the Milwaukee study. The study patients were later reclassified by the study personnel (physicians and nurses) from the ambulatory and nonambulatory classification to three classifications: "Minimum, Moderate," and "Maximum" nursing care needs. The reclassification was mainly subjective and no specific criteria were applied; therefore, the criteria for determining the patient's nursing needs in this study were determined by the Project Director, with consultation from nurses knowledgeable in the care of nursing home patients. The definitions for ambulation classification were identical to the Milwaukee study. The responsibility of the evaluation of study patients was entirely that of the Project Director and Supervisor.

The Observer Record consisted of 24 specific nursing care areas and one miscellaneous area. Each area included a number (one to nine) of activities identified with the particular area.[6] Activities, as used in the Observer Record is synonymous with procedures. Every area differed numerically in the number of procedural steps to be evaluated by the observer. The total number of steps for the 24 areas was 607, an increase of 56 over the previous study. They were coded by the observers as "given, not given," or "not applicable." This coding of procedural steps produced the commission and omission data. The commissions are those procedural steps coded by the observers as "given" and the omissions are those steps coded as "not given." The "not applicable" code was a procedural step

[4] See appendix for examples, pp. 24, 27.

[5] See appendix, pp. 31, 32.

[6] See appendix, p. 26.

not required in the performance of the nursing activity being observed. The Observer Record provided the statistical data concerning the nursing care area, the activity in the area, identification of nursing personnel performing the nursing activity, personnel level, identification of patient, time in minutes to complete the activity, date, and shift observed.

A system of identifying a "multiple person activity" was developed due to the frequency with which they were occurring. For the purposes of the project, this practice was defined as:

> any activity performed for a *single* patient by more than one nursing personnel or started by one and completed by another shall be called a *multiple person activity* (MPA).

One Observer Record was used by the nurse observer for each shift for each group of three patients she observed.

The observers were provided a spcially designed clip board, with attached stop watch, for carrying the Observer Record and recording her observation. The Observer Records were to remain in the observer's possession at all times while she was in the nursing home as the information in the records was considered confidential and was to be used for statistical analysis. Guides for the use of the Observer Record were given to the observers and regular briefing sessions were held for clarification of problem areas in an effort to preserve continuity and accuracy of data.

IDENTIFICATION PROCEDURE

The statistician used a table of random numbers to assign an identifying number to each of the nursing homes. This number was entered on the Observer Records by the secretary after the records were completed and ready for processing. The nurse observer entered the name of the home only on the Observer Record.

The patients were assigned successive numbers in the order by which they were observed; and the replacement patients were distinguished by a special code. The patient's name and number were entered on all Observer Records by the nurse observers.

The shift numbers were assigned in the same method commonly used and accepted by nursing services in health facilities.

Shift No. 1 7:00 a.m.– 3:00 p.m.

Shift No. 2 3:00 p.m.–11:00 p.m.

Shift No. 3 11:00 p.m.– 7:00 a.m.

A listing of the nursing personnel by name and personnel level was secured from each nursing home before the observations were begun. Numbers were assigned by the project secretary that identified both the individual and his or her personnel level,[7] and a subsequent list containing the names with the identification number was given to the nurse observers for use during the observation period. The observers were acquainted with the coding used for personnel and were responsible for assigning a number in the home to newly employed personnel should any appear during the observation period.

DATA COLLECTION

The data were collected over a period of 20 weeks, from November 1965 through April 1966. The nurse observers were in the nursing homes for periods of 1 or 2 weeks, depending upon the number of patients to be observed in the home. There were never more than two observers in a home at one time, except for the short periods of reporting on and off duty.

The nursing personnel and patients of the nursing homes were acquainted with the project program and its objectives prior to the arrival of the nurse observers in the home. In the beginning, as could be expected, some of the nursing personnel appeared apprehensive about the presence of strangers. However, with reassurance that neither they nor their performance was being criticized, they accepted the nurse observers and were very cooperative. The nurse observers were instructed to be completely objective; no indication of feeling nor judgment was to be spoken or demonstrated regarding the care observed; they should be alert to neither agree nor disagree with personnel regarding assignment of workloads, management policies, or other controversial issues; and they were not to assist in giving or to give any patient care except in an extreme emergency. All efforts were made to cause as little disruption as possible in the existing routine of the nursing home.

The nurse observer who was assigned to begin the observations of each group of three patients

[7] See: Job Descriptions of Nursing Personnel in Nursing Homes, appendix, p. 33.

had the responsibility for advising the Administrator or Director of Nursing of the nursing home of the group selected. The nursing homes were very helpful in keeping the project office informed about discharges of patients. This avoided loss of observation time. There were only four replacements necessary in the entire project, thus making it possible to observe a total of 195 patients. One patient was not included as his observation period was less than 12 hours. The time limits of observation for each patient had been established as no fewer than 12 hours and no more than 84 hours. The expected total time of patient observation was 16,128 hours; the actual total time reported was 16,097 hours, or 99.81 percent.

Nurse observers were assigned on 8-hour shifts, which was the preferred length of observation periods in the Milwaukee study. Schedules of working hours and days for observers were planned for at least 3 weeks in advance. Provisions were made for any necessary changs in the schedule in an effort to sustain continuity of patient observation. Provision was also made for substitution of nurse observer, although none was necessary during the observation period.

Nurse observers wore street clothes rather than uniforms to eliminate as much as possible requests for care from patients, their families, and visitors. However, it was necessary that they be identified as nurses if observations were to be complete and accurate. An attempt was made to insure that observations represented the usual level of patient care.

In the initial observation of the sample patient, the nurse observer began her observation at the point when the first nursing activity began. Any activity in progress when the observer reported to her observation area was not included. During the continuing observation, if an activity began during the observer's shift and extended into the next shift, the observer remained to complete the observation of the activity; and the observer for the next shift began her observation when the next activity began. Likewise, the observer assigned to the last shift of observation reamined to complete any activity that began during her shift. The Observer Record for each shift was to be completed before the nurse observer left the nursing home. All records were reviewed by the Supervisor with each nurse observer on a current basis (at least twice a week during the entire project).

A stop watch was used to time each activity (including pre- and post-preparation), which was recorded in minutes and seconds. The seconds were converted to quarters of minutes for tabulation.[8]

Data were collected on one form other than the study instruments, Nursing Home Employee Weekly Work Schedules, which were maintained for the observation periods in each of the nursing homes. The schedule included the name, job classification (level), actual hours of work by day, and total hours for the week of each nursing personnel in the home, and the daily patient census.

A master record of data was maintained by the Secretary. This record listed the nursing home; the sample patients by number and dates of observation; the Observer Records by date, shift, nurse observer, and completion; the Patient Profiles required and completed; and the Nursing Home Employee Weekly Work Schedules required and completed.

The content of the Observer Record and the Patient Profile; the method of orienting the nurse observers; the method of evaluating the patient's nursing need and ambulation classification; the coding of the Observer Record, nursing home, patient, shift, and nursing personnel have been discussed in an earlier section of this report.

ANALYSIS OF DATA

After the coding of Observer Records and Patient Profiles was completed, data were transferred to key punch cards and then to magnetic tapes for computer processing. Data were tabulated for analysis primarily by computer with only a few instances of hand tabulating where the numbers were small.

The data were analyzed to determine whether the geographic setting or the patient population of the nursing homes may have influenced (1) the time it takes to perform the nursing activities in the 24 nursing care areas, (2) the average hours of daily patient care, (3) the levels of personnel on duty, (4) the shift assignment of levels of personnel and, (5) characteristics of patient including age, ambulatory status, nursing need, and sex.

Two areas of nursing care, medications, and rehabilitation and recreational care, were tabulated

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[8] Method for converting seconds to quarters of minutes:

0–15 seconds = 00.25 minutes

16–30 seconds = 00.50 minutes

31–45 seconds = 00.75 minutes

46–59 seconds = 1.00 minutes

according to the average time per day per patient (1) for each home in the study, (2) for the geographic setting, and (3) for the patient population.

Other data were analyzed to determine the effect of (1) the nursing need of the patient, (2) the ambulatory status of the patient and, (3) the level of personnel giving care on the time it takes to perform the nursing activities in the 24 nursing care areas.

Data concerning commissions and omissions of procedural steps in the nursing activity were tabulated into the patient care categories [9] and studied by the category of personnel level for possible implications for quality of nursing care.

A comparison of the study patients from the Milwaukee study and the Denver project was analyzed for differences in average hours of daily care according to the patient's nursing need and ambulatory status.

A few tests of significance were applied to relevant data in the project; however, the majority of the findings reported are nonstatistical generalizations derived from the investigator's interpretation of the collected data and descriptions of baseline information concerning nursing care observed, the sample homes, and the sample patients.

[9] See appendix, p. 38.

Findings

The universe of 47 nursing homes represented a patient population of 4,044 if 100 percent occupied. The patient population, if 100 percent occupied, in the 14 homes selected for the project was 1,385; however, during the observation period, the occupancy rate was 91.70 percent, or 1,270 patients. The 195 observed patients were a 15.35 percent sample of the actual patient population in the homes.

Table A illustrates in percentage form the distribution of the sample homes and sample patients according to geographic area, and table B illustrates their distribution according to patient population.

Table A.—Percentage distribution of nursing homes and patients by geographic area

Geographic area	Homes		Patients	
	Number	Percent	Number	Percent
City	5	35.71	79	40.51
Metropolitan	6	42.86	86	44.10
Rural	3	21.43	30	15.39
Total	14	100.00	195	100.00

Table B.—Percentage distribution of nursing homes and patients by patient population

Patient population	Homes		Patients	
	Number	Percent	Number	Percent
Fewer than 91	8	57.14	66	33.85
More than 91	6	42.86	129	66.15
Total	14	100.00	195	100.00

The tables are primarily informative with no statistical inference intended, as the sample of homes was a purposive sample for geographic setting and home size, and the sample of patients was determined according to the home size alone. These factors could well account for the differences between home and patient distribution.

The staff/patient ratio was not affected by the size of the home nor its geographic location, as the minimum standards for staff requirements in a nursing home in Colorado [3] were based on two factors: (1) the level of personnel to be in charge of nursing care, and (2) a ratio of nursing personnel (term is all-inclusive of RN, LPN, aide, and orderly) to a specified number of patients for each shift in a 24-hour day.

However, the staff/patient ratio did differ by level of personnel. The aides (included aides and orderlies) had the highest ratio, 8.16:100, the registered nurses (RN) had the intermediate ratio, 1.76:100, and the licensed practical nurses (LPN) had the lowest ratio, 1.37:100. Since nursing personnel work on both a full- and part-time basis, the total number of hours on duty and the patient census in each home during the observation period were used to determine the staff/patient ratio. The ratios indicate the average number of nursing personnel on duty in an 8-hour shift for every 100 patients in the combined total of the 14 nursing homes in the study.

CHARACTERISTICS OF SAMPLE PATIENTS

The largest number of patients entered the nursing homes directly from their own or relatives' homes. The next largest group were admitted from a hospital setting, either general or psychiatric, and the remainder transferred from another nursing home.

Table C.—Percentage distribution of 195 patients according to source of admission to nursing homes

Source of admission	Number	Percent	Total Number	Total Percent
Home residence	—	—	101	51.8
Own	70	35.9	—	—
Relative	31	15.9	—	—
Hospital	—	—	67	34.4
General	41	21.0	—	—
Psychiatric	26	13.4	—	—
Nursing home	—	—	27	13.8
Total	—	—	195	100.0

The patients' length of stay in the nursing homes ranged from a few days to over 5 years. The largest numbers were in the 1-day but less than 6-months group, and the least were in the 5-years and over group. The median length of stay was 1 year but less than 2 years.

Table D.—Percentage distribution of 195 patients according to length of stay in the nursing home

Length of stay	Number	Percent
1 day but less than 6 months	59	30.3
6 months but less than 1 year	32	16.4
1 year but less than 2 years	42	21.5
2 years but less than 5 years	52	26.7
5 years and over	10	5.1
Total	195	100.0

The patients ranged in age from 53 to 101. The largest percentage, 30.77 percent were in the 81–85 range. The actual mean age was 80.77 years, with the median for females in the 81–85 range and median for males in the 76–80 range. Both the youngest and the oldest were males. Table E shows the distribution of patients according to age and sex. Of the total sample, 29.74 percent were male and 70.26 percent were female.

Table E.—Percentage distribution of 195 patients according to age and sex

	Male		Female		Total	
	Number	Percent	Number	Percent	Number	Percent
Under 65	6	10.3	7	5.1	13	6.67
65–70	6	10.3	11	8.0	17	8.72
71–75	11	19.0	11	8.0	22	11.28
76–80	7	12.1	17	12.4	24	12.31
81–85	13	22.4	47	34.3	60	30.77
86–90	6	10.3	25	18.2	31	15.89
91–95	5	8.6	16	11.7	21	10.77
96–100+	4	7.0	3	2.3	7	3.59
Total	58	100.0	137	100.0	195	100.00

The greater number of women than men follows the general trend seen in the aged residing in nursing homes. Milwaukee's study showed the same trend with an even larger percentage of women, 79 percent, and 21 percent of men. It might also be noted that the distribution of the sexes differs within the age groups; for example, there is a larger percentage of males in the younger age groups, 51.7 percent, as compared to 33.5 percent for females under 81 years of age—a difference of 18.2 percent.

Approximately one-half of the total patient sample, 48.7 percent, were moderate nursing need patients, 66.3 percent of these were ambulatory and 33.7 percent nonambulatory; 32.8 percent of the others were minimum need patients, 98.4 percent ambulatory and 1.6 percent nonambulatory; and 18.5 percent were maximum need patients, 2.8 percent ambulatory, and 97.2 percent nonambulatory.

Table F.—Percentage distribution of 195 patients according to nursing need and ambulatory status

	Nursing need		Ambulatory		Nonambulatory	
	Number	Percent	Number	Percent	Number	Percent
Minimum	64	32.8	63	98.4	1	1.6
Moderate	95	48.7	63	66.3	32	33.7
Maximum	36	18.5	1	2.8	35	97.2
Total	195	100.0	127	65.1	68	34.9

The ambulatory status distribution of 65.1 percent ambulatory and 34.9 percent nonambulatory patients in the Denver sample was a reverse of the distribution in the Milwaukee study where 38.6 percent were ambulatory and 61.4 percent were nonambulatory in the total sample of 114 patients.

The probability of this difference being due to chance was less than one in a thousand.[10] It could, however, be attributed to the fact that 12 of the 14 homes in the Denver project had participated in a statewide training program of rehabilitation nursing care for nursing home patients a year or so prior to the beginning of this project. Application of the program content to patient care should definitely have influenced the ambulatory status of the patient sample in this direction.

A compilation of the patient characteristics—age, ambulatory status, nursing need, and sex—is presented in table 1 (p. 41) by geographic area and in table 2 (p. 41) by patient population.

Examination of the data for possible influence of the geographic setting or of size of home (patient population) on the patient characteristics shows that the proportion of men to women steadily increased as the geographic setting moved from the city area, to the metropolitan area, to the rural area; it was also higher for the larger homes.

The proportion of nonambulatory patients to ambulatory also increased as the geographic setting moved from the city to the rural area; however, the increase was chiefly from the city to the metropolitan area, with a small increase from the metropolitan to the rural. Proportion varied very little with home size (patient population).

Table G.—Sex distribution of 195 patients according to geographic area and patient population

	Sex		Geographic area						Patient population			
			City		Metro.		Rural		<91		>91	
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
Men	58	30	19	24	27	32	12	40	14	22	44	34
Women	137	70	60	76	59	68	18	60	52	78	85	66
Total	195	100	79	100	86	100	30	100	68	100	129	100

Table H.—Ambulatory status distribution of 195 patients according to geographic area and patient population

	Amb. status		Geographic area						Patient population			
			City		Metro.		Rural		<91		>91	
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
Amb	127	65.1	56	70.9	53	61.6	18	60.0	42	63.6	85	65.9
Non amb	68	34.9	23	29.1	33	38.4	12	40.0	24	36.4	44	34.1
Total	195	100.0	79	100.0	86	100.0	30	100.0	68	100.0	129	100.0

Some differences were noted in the level of nursing needs by geographic area. There was a tendency for the rural homes to have a higher proportion of patients with maximum needs, 26.7 percent versus 19.8 percent and 13.9 percent; while the city homes tended toward having a higher proportion of patients with moderate needs, 51.9 percent versus 47.7 percent and 43.3 percent. The metropolitan homes had proportions very similar to the total sample proportions. Little difference was noted between geographic areas for the minimum need level.

The differences noted in the level of nursing needs by patient population (home size) showed the tendency of the smaller homes to have the higher proportion of maximum need patients and the larger homes to have the higher proportion of minimum need patients, with the moderate need level showing very little difference.

Use of the Chi-square test on both factors of geographic setting and patient population gave the result that the probability was greater than .95 that these differences could have occurred by chance.

[10] Chi-square = 20.30

P = < .001

Minimum value Chi-square at .1 percent = 10.83

Table I.—Nursing need distribution of 195 patients according to geographic area and patient population

	Nursing need		Geographic area						Patient population			
			City		Metro.		Rural		<91		>91	
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
Minimum	64	32.8	27	34.2	28	32.5	9	30.0	19	28.8	45	34.9
Moderate	95	48.7	41	51.9	41	47.7	13	43.3	31	47.0	64	49.6
Maximum	36	18.5	11	13.9	17	19.8	8	26.7	16	24.2	20	15.5
Total	195	100.0	79	100.0	86	100.0	30	100.0	66	100.0	129	100.0

For investigation of the age characteristic, the eight age ranges were combined into three: (1) < 65 – 75; (2) 76 – 85; and (3) 86– 100+. When combined, the differences in the age groups by geographic area and by patient population (home size) were more evident.

The proportion of the older age group was considerably higher in the city homes, 37.9 percent, as contrasted to 25.6 percent in the metropolitan, and 23.3 percent in the rural homes. The rural homes had the highest proportion of the younger age group, 33.3 percent, versus 20.3 percent in the city and 30.2 percent in the metropolitan homes. The middle-age group proportions were quite uniform for both geographic area and home size, as could be expected because it included the median range groups for the men and the women.

The differences between home size were fewer than those for the geographic areas. The greater proportion of the older age group, 34.9 percent, resided in the smaller homes, as opposed to 27.9 percent in the larger homes; while the younger age group was the opposite, with 29.4 percent in the larger homes and 21.2 percent in the smaller homes.

Table J.—Age distribution of 195 patients according to geographic area and patient population

	Age		Geographic area						Patient population			
			City		Metro.		Rural		<91		>91	
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
<65–75	52	26.6	16	20.3	26	30.2	10	33.3	14	21.2	38	29.4
76–85	84	43.1	33	41.8	38	44.2	13	43.4	29	43.9	55	42.7
86–100+	59	30.3	30	37.9	22	25.6	7	23.3	23	34.9	36	27.9
Total	195	100.0	79	100.0	86	100.0	30	100.0	66	100.0	129	100.0

The differences noted between geographic areas and between home sizes (patient population), when examined for significance for each of the characteristics, could have occurred by chance.

NURSING CARE AREAS

In tables 3 and 4 (pp. 42–43), the mean (average) times for each of the 24 nursing care areas observed in the project are presented. The mean for 195 patients is designated as the "overall mean" in the tables. Table 3 includes the mean time needed for (1) the personnel level performing the nursing activities; (2) ambulatory or nonambulatory patients; and (3) the minimum, moderate, or maximum need patients. Table 4 includes the mean time needed according to geographic area and patient population of the nursing homes. The mean values in both of these tables were computed from data that included *only* those activities that were completed by one person. Of the 23,690 nursing activities observed in the project, 73.1 percent were completed by a single person and 26.9 percent were completed by two or more persons. There were two nursing care areas in which no activities were observed—Gavage, and Preparing Body After Death; two areas in which only one patient received care—Colostomy Care and Female Procedures; and two areas in which all activities were completed by one person—Care of the Nails and Female Procedures.

Upon examination of the mean time needed by the personnel levels to perform nursing activities, it was noted that the aide was the only level of personnel who gave care in all 23 nursing areas observed; as compared to the LPN in 19 areas, the RN in 17 areas, and "other" (primarily relatives) in 14 areas. The two levels of "other" and aide had the larger proportions of highest mean times for performing nursing activities—39.1 percent and 34.8 percent respectively—as compared to 17.4 percent for the RN, and 8.7 percent for the LPN.

From these data, two factors seem apparent: (1) the auxiliary persons are performing the majority of the nursing activities; and (2) they need more time to perform the activity.

The effect of the patient's ambulatory status on the mean time was as expected: the nonambulatory patients had 69.6 percent of the highest mean times, as compared to 30.4 percent for the ambulatory patients.

The nursing needs of the patient also reflected the expected effect with the maximum need patients having 65.2 percent of the highest mean times, versus 26.1 percent for the moderate need patient, and 8.7 percent for the minimum need patient.

The highest mean times were quite evenly distributed among the geographic settings, with the city and rural areas having 34.8 percent each and the metropolitan areas having 30.4 percent.

In the remaining 11 areas the single person mean time was lower than the mean time when both single and multiple person activities were included. In two of the areas where the single person mean time was higher, there were, in fact, more multiple person than single person activities observed—Food and Nourishment, and Enema.

The number of occurrences per area ranged from a low of three for Female Procedures to a high of 5,994 for Associated Nursing Care Functions. Nine of the areas had fewer than 100 occurrences; four had 100 to 300; three had 301 to 500; two had 501 to 900; three had 2,000 to 4,000; and two had over 5,000. These figures include all activities, single and multiple person.

The mean values presented are for the nursing care areas, each of which are comprised for the most part of several activities. The activities within each area may vary considerably in the time necessary to complete them individually, and the mean for the area was dependent on the number of occurrences of the activities within the area. An example is the Catheterization area where the activities are well recognized as quite different in required performance time for completion. Further study of this phenomenon will be recommended.

AVERAGE DAILY CARE

Tables 7 through 19 (pp. 46, 50) contribute information regarding factors that are relevant to the average daily care for the patients observed in the project.

The patient population (size) of the homes showed a difference of only 4.4 percent in favor of the larger homes for higher mean times, which was actually one more area than the smaller homes, a ratio of 12:11 of the 23 nursing care areas.

The investigator realizes that the mean time factor has been reported in very little depth here; to study this factor in depth would necessitate considerable time and might well be done at a later date.

Table 5 (p. 44) gives the individual nursing home information regarding the total time observed for each of the nursing care areas in their home, and table 6 (p. 45) shows the average (mean) time per occurrence for the nursing care areas. Table 6 also includes an overall average that differs from that found in tables 3 and 4 in that it was computed on all activities, both those completed by a single person and those completed by two or more persons. The averages by homes are also computed on the total activities for the home.

A comparison of the two overall means, one with and one without the multiple person activities included, showed that in eight areas, namely: Bathing, Bed Making, Oral Hygiene, Food and Nourishment, Medications, Urine Tests, Enema, and Weighing Patient, the single person mean time was higher. Four areas had equal means: Care of the Nails, Female Procedures, Colostomy, and Associated Nursing Care Functions. The first two in this group are necessarily equal as all occurrences were single person activities and the third could well have been equal as only one patient received care in this area.

The average daily care is presented in all tables by hours as opposed to minutes reported for the nursing care areas. The average per patient was computed from the total number of hours each was observed; therefore, for those patients who were observed for only a part of the expected total of 84 hours, their average was accordingly prorated. The 84 hours represented 3½ days of observations.

The frequency distribution of average hours of nursing care per day received by patients is presented in table 7 (p. 46) by geographic area, and in table 8 (p. 46) by patient population. Nursing need and ambulatory status of the patients are represented in both tables.

The average daily care for the total sample was 1.30 hours; the range was 10 minutes to 4 hours

and 26 minutes. The greater proportion of the patients received fewer than 1.50 hours of nursing care per day, 64.7 percent as compared to 27.2 percent who received from 1.50 to 2.50 hours of care, and 8.1 percent who received from 2.50 to 4.50 hours of care.

In table K differences are noted in the distribution of average hours per day according to geographic area and home size. The rural area had the greater proportion of patients receiving fewer than 1.50 hours of care, 69.9 percent as compared to 60.5 percent in the metropolitan area and 57.2 percent in the city area. However, that area also had the greater proportion of patients receiving over 2.50 hours of care: 16.7 percent versus 7.5 percent for the city, and 5.8 percent for the metropolitan. The average daily care for the individual areas varied only slightly—1.23 hours in the city homes, 1.35 hours in the metropolitan homes, and 1.30 hours in the rural homes. A test of significance applied to the mean hours revealed no significant differences between the geographic areas.

The ranges of average daily care for the geographic areas were:

City —16 minutes to 3 hours, 25 minutes

Metropolitan—10 minutes to 4 hours, 26 minutes

Rural —13 minutes to 4 hours

From the distribution, the larger homes tended toward giving the lesser average hours of daily care than the smaller homes, with 69.7 percent versus 54.5 percent receiving fewer than 1.50 hours. The average daily care for the homes having fewer than 91 patients was 1.58 hours and for those having more than 91 patients, it was 1.16 hours. This difference between means was tested with the t statistic, and was found significant at the 1 percent level; the probability of this difference being due to chance was less than one in one hundred.

The ranges of average daily care for the home sizes were:

Fewer than 91—20 minutes to 4 hours

More than 91—10 minutes to 4 hours, 26 minutes

Table K.—Distribution of average daily care for 195 patients according to geographic area and patient population

Average daily care (Hours)	Geographic area						Patient population			
	City		Metro.		Rural		<91		>91	
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
0.00–0.49	13	16.5	16	18.6	6	20.0	3	4.5	32	24.8
0.50–0.99	24	30.4	21	24.4	11	36.6	21	31.8	35	27.1
1.00–1.49	16	20.3	15	17.5	4	13.3	12	18.2	23	17.8
1.50–1.99	9	11.4	11	12.8	2	6.7	5	7.6	17	13.2
2.00–2.49	11	13.9	18	20.9	2	6.7	16	24.2	15	11.6
2.50–2.99	4	5.0	2	2.3	2	6.7	4	6.1	4	3.1
3.00–3.49	2	2.5	1	1.2	2	6.7	4	6.1	1	.8
3.50–3.99	—	—	—	—	—	—	—	—	—	—
4.00–4.49	—	—	2	2.3	1	3.3	1	1.5	2	1.6
Total	79	100.0	86	100.0	30	100.0	66	100.0	129	100.0

Table L.—Distribution of average daily care for 195 patients according to nursing need and ambulatory status

Average daily care (Hours)	Nursing need						Ambulatory status			
	Minimum		Moderate		Maximum		Ambulatory		Nonambulatory	
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
0.00–0.49	30	46.8	5	5.3	—	—	33	25.9	2	2.9
0.50–0.99	31	48.4	24	25.2	1	2.8	52	40.9	4	5.9
1.00–1.49	2	3.2	31	32.7	2	5.6	25	19.7	10	14.7
1.50–1.99	—	—	15	15.8	7	19.4	6	4.7	16	23.5
2.00–2.49	1	1.6	16	16.8	14	38.9	9	7.2	22	32.4
2.50–2.99	—	—	4	4.2	4	11.1	2	1.6	6	8.8
3.00–3.49	—	—	—	—	5	13.9	—	—	5	7.4
3.50–3.99	—	—	—	—	—	—	—	—	—	—
4.00–4.49	—	—	—	—	3	8.3	—	—	3	4.4
Total	64	100.0	95	100.0	30	100.0	127	100.0	68	100.0

The distribution of average daily care hours by nursing need and ambulatory status is shown in table L. The nursing need had a very evident influence on the average daily hours of care received by patients; 95.2 percent of those with minimum needs had fewer than 1 hour per day, 89.0 percent of those with moderate needs had fewer than 2 hours per day, while 72.2 percent of those with maximum needs had over 2 hours per day. The average daily care hours for the three nursing need levels were: minimum—.56 hours, moderate—1.36 hours, and maximum—2.41 hours. The range was 1.85 hours. The analysis of variance among all levels of nursing need indicated that the mean hours differed significantly at the .1 percent level; the probability of this difference being due to chance was less than one in one thousand.

The ranges of average daily care for the nursing needs were:

Minimum—10 minutes to 2 hours, 20 minutes

Moderate —14 minutes to 2 hours, 40 minutes

Maximum—58 minutes to 4 hours, 26 minutes

The ambulatory status also influenced the average daily hours of care received; the ambulatory patient's average daily care was .90 hours and the nonambulatory patient's was 2.03 hours. A t test of the difference between these means was significant at the .1 percent level; the difference being due to chance was the same as for the nursing need, less than one in one thousand.

The ranges of average daily care for ambulatory status were:

Ambulatory —10 minutes to 2 hours, 40 minutes

Nonambulatory—25 minutes to 4 hours, 26 minutes

Tables 9 through 13 (pp. 47–48) contain information for the individual nursing homes regarding the time difference between the total patient sample average daily care and the average daily care given in their homes to patients with minimum, moderate, and maximum nursing needs and to ambulatory and nonambulatory patients. The number of patients for each home and range of average daily care are also presented in these tables.

In the comparison of the Denver project patients and the Milwaukee study patients, the total Denver sample was found to have fewer mean hours of daily patient care. This was mainly due to the fact that Denver had a larger percentage of minimum need and ambulatory patients, while Milwaukee had a larger percentage of maximum need and nonambulatory patients. Both maximum need patients and nonambulatory patients are expected to require more care. Comparisons were therefore made between the Milwaukee sample and a *matched* Denver sample. The Denver samples in these analyses were matched in terms of the percentages of patients falling into each of the ambulatory status and nursing need categories. (The matching procedure is described in the appendix, p. 40.) In the Milwaukee study, the average daily care had included overhead time of the nurse supervisor; for the analysis of Denver versus Milwaukee patients, this was subtracted as no overhead time was included in the average daily care for the Denver patients.

The analyses were made on average hours of daily care for two groups of sample patients from the Denver project: (1) proportional Denver sample versus all Milwaukee patients with overhead subtracted; and (2) proportional Denver sample from the "under 91" homes versus all Milwaukee patients with overhead subtracted. In both analyses, a t test indicated no significant difference between average daily care received by the Milwaukee and Denver patients. The summary of the analyses in the appendix (p. 40) shows the progression: as the samples were made more and more alike, the significant differences became less and less.

Tables 14 and 15 (p. 48) provide data concerned with: (1) the total number of hours on duty for the nursing personnel who were observed giving nursing care to the study patients; and (2) the total number of hours these nursing personnel gave to the study patients during the 3½-days' study period. Inclusive in these data are the level of nursing personnel (RN, LPN, Aide, and Other), the geographic area, and the patient population.

Tables 16 through 19 (pp. 49–50) provide percentage data (derived from the total number of hours given to study patients) on the distribution of the different levels of nursing personnel time by shifts according to: (1) individual nursing homes (table 16, p. 49); (2) combined total of homes (table 17, p. 50); (3) geographic areas (table 18, p. 50); and (4) patient population (table 19, p. 50).

Examination of these data shows that 81.14 percent of the nursing care observed was given by auxiliary personnel, 73.84 percent by aides, and

7.30 percent by other (relatives in most instances); 18.86 percent was given by licensed personnel, 12.34 percent by the licensed practical nurse, and 6.52 percent by the registered nurse. The greater proportion of time was given on the first shift for all levels of personnel, as is generally found in most health facilities.

In table M, the average hours of daily care given by the three levels of nursing personnel were compiled for examination and analyses of three variables: (1) ambulatory status; (2) nursing need; and (3) home size. The geographic setting variable is not presented here as it had no apparent effect on the average hours of daily care.

Tests of significance were applied to the differences between the mean hours of the levels of nursing personnel for each of the variables. These differences in all instances produced an analyses of variance F significant at the .1 percent level, the probability of these differences being due to chance was less than one in one thousand.

Table M.—Average hours of daily care given by levels of nursing personnel according to ambulatory status, nursing need, patient population and total sample

Variables	RN	LPN	Aide	Total personnel
Ambulatory status				
Ambulatory	.07	.13	.62	.90
Nonambulatory	.12	.22	1.57	2.03
Nursing need				
Minimum	.05	.10	.36	.56
Moderate	.09	.16	1.00	1.36
Maximum	.14	.28	1.88	2.41
Patient population				
Fewer than 91	.13	.20	1.14	1.58
More than 91	.07	.14	.85	1.16
Total sample	.09	.16	.95	1.30

An additional comment regarding table M.: the figures in the last column, Total personnel, are approximately .10 hours more than the sum of the three levels of personnel for each of the variables. This difference represents the care given by the "other" level of personnel (mostly relatives) during the observation of the sample patients. Their average daily care was approximately 6 minutes.

COMMISSIONS AND OMISSIONS

As previously discussed under "Methodology," the nurse observers coded each procedural step in the nursing care areas observed with one of three codes: given, not given, or not applicable. The data concerned with commissions and omissions were derived from this coding. The commissions were those procedural steps given and the omissions were those not given. These are the only commissions and omissions reported from this project.

Table 20 (p. 51) provided data on the percentages of commissions and omissions by the personnel levels for the individual nursing homes and for the total sample. Examination of this table showed that the ratio of commissions to omissions was approximately 4:1 for the total sample, with 80.4 percent of the procedural steps being given, and 19.6 percent not given. The percentage ratios for the individual homes ranged from 74.9 percent to 25.1 percent (approximately 3:1) to 84.8 percent to 15.2 percent (approximately 6:1).

Table 21 (p. 52) lists the number of commissions by personnel level and patient care categories[11] and table 22 (p. 53) lists the number of omissions by personnel level and patient care categories for each home in the project. These tables were included for the nursing homes and no analyses were made on these data for this report.

However, table 23 (p. 54), which provides data expressed as percentages of total commissions and omissions for each level of nursing personnel in the total sample in the patient care categories, was examined for implications of quality in the nursing care observed in the project. The "other" level of personnel was not included in the examination for quality of care.

If one looks only at the percentages expressed in the total column for all categories, it will be noted that the aides had the highest commission percentage, 81.5 percent, as compared to RN with 79.5 percent and the LPN with 75.6 percent. An analysis of variance among all personnel levels, taken together, indicated that these mean percentages differ significantly at the 5 percent level; the probability of the differences being due to chance was less than five in one hundred. The reason for this difference can most likely be associated with the differences noted previously (p. 9) in staff/patient ratio for the personnel levels.

For the quality of nursing care, the level of personnel commission percentages for the patient care categories was considerd. In all categories but one, Psychological and Mental Needs, the registered nurse had the highest commission percentage, and in that category, the licensed practical nurse had the highest commission percentage. The aides had

[11] See appendix, p. 38.

the lowest commission percentage in all of the categories but one, Rehabilitation and Recreation; in this category, the licensed practical nurse was lowest. From these observations concerning the personnel levels, the more professional the preparation of the personnel, the better the quality of care given.

However, when all of the patient care categories are considered, the quality of care given is on the minus side for the category of Safe, Aseptic Techniques for the total personnel. The registered nurse is only 6.9 percent on the positive side, and the licensed practical nurse is only .3 percent.

The commission and omission area might well be an area for further investigation in depth as the categories of patient care, in the investigator's opinion, have content contributing to the quality aspect of nursing care.

PARTICULAR AREAS OF NURSING CARE

Tables 24 and 25 (p. 54) are tabulations of two of the 23 nursing care areas observed in the Denver project. Contained in these tables are: (1) the number of patients, (2) the total time given for the area, and (3) an average time per day for each patient in the individual nursing home and for the total patient sample. Table 24 concerns the area of administering medications and table 25 concerns the area of rehabilitative and recreational care. The time is expressed in minutes in these tables.

Tables 26 and 27 (p. 54) provide data on the same two areas of nursing care with regard to the average time per day per patient according to the geographic areas and patient population.

These tables show, as do many previous ones in the report, that the geographic setting has no apparent influence on the nursing care, but the size of the home (patient population) does influence the nursing care.

The average time for medications included preparation time, administration time, cleaning of equipment time, and charting time, if this was the only purpose for the charting. An effort was made to separate this charting time from other charting time. However, this was not always accomplished. The average time per day per patient does not appear particularly high in view of the numbers of medications prescribed for the patients in the nursing homes. The averages vary from 1.94 minutes to 13.33 minutes per patient in the 14 nursing homes, which is most likely due to the number of medications or type of medictions received by the sample patients. The average time per patient seems quite small, but when one considers that there were 1,270 patients in the 14 homes and if each received the average time of 6.4 minutes, 135.46 hours would be used for medications, requiring the time of 16.93 nurses each working 8 hours to accomplish the care necessary for medications alone.

The rehabilitative and recreational area did not receive as much time as did the medications area. The average time per day per patient was 3.69 minutes and the variation was considerably more —less than 1 minute (.88) to 18.93 minutes. The 18.93 minutes average was largely influenced by the fact that the sample patients attended a 2-hour movie during the observation period. The other high average of 12.20 minutes was influenced by the purposive admission policy of the home. Patients were admitted to this home particularly for rehabilitation and were screened accordingly.

Summary and Conclusions

Because nursing care is the largest component of services rendered to patients residing in nursing homes, data were needed that would provide a sound basis upon which to establish guidelines for staffing patterns. In this project, a replication of the study design developed in the Milwaukee study in 1962–63 was performed in 14 nursing homes located in the Denver Metropolitan area of Colorado to determine whether data collected by such an approach would provide information relevant to the problem of staffing. Data such as the time required for the various categorical levels of nursing personnel to complete specific nursing activities for patients with minimal, moderate, or maximum nursing needs and for patients who were ambulatory or nonambulatory; the quantity of nursing activities required in specific areas of nursing care; the type of omission in the nursing services by the categorical levels of personnel; the distribution of personnel by shift; and the characteristics of patients residing in nursing homes were considered as baseline information.

The method was based upon observation of the nursing care received by a sample of patients chosen at random from each of the 14 nursing homes selected. The size of the patient sample was dependent upon the patient population of the home and was limited to no fewer than six and no more than 24 patients per home, resulting in a total of 195 (including the replacement patients). The nursing homes were purposively selected to include homes in the City of Denver comparable to those in the Milwaukee study, plus some that were larger and some that were located in the metropolitan and rural areas adjacent to the city area, to test the capability of the method for extension to all types of homes.

Additional objectives of the purposive sample were to determine to what extent the size (patient population) or geographic location of the homes varied (1) in the time it took to complete the specific nursing activities, (2) in the average hours of daily care received by the patients, (3) in patient load characteristics, and (4) in nursing personnel shift assignment.

Two instruments were used in the collection of data. Patient care data were collected on the Observer Record, which contained 24 nursing care areas, by nonparticipant nurse observers. Each nursing activity utilized in the care of a patient was timed, identified, and the procedural steps coded as to commission or omission. The categorical level of personnel performing the activity, the shift, date, patient, home, and observer were also identified on the Observer Record. Each nurse observer was responsible for a group of three patients. The observation period for each group totaled 3½ days; i.e., 3 consecutive days (24 hours per day) and one-half day on Sunday. Data for assessment of the patient's nursing need and ambulatory status were collected on the Patient Profile by the supervisor of nurse observers from the patient record, observation of the patient, and discussion of the patient with the nursing personnel.

There was interest as to whether modifications of the instruments would be necessary because of geographical setting, size of the home, composition of patient load, difficulties in the use of the Observer Record in the nursing care areas, activities, and procedural steps, or difficulties in the use of the Patient Profile record. In general, the use of the Observer Record proved satisfactory in all of the nursing homes regardless of size, geographic location, or patient load characteristics. However, experience showed a need to further define the procedural steps required for certain activities of the nursing care areas. Likewise, the Patient Profile was satisfactory for the different types of nursing homes and patients, but again, there were some difficulties in the use of the instrument and certain sections need to be revised for a more accurate description of the patient needs and abilities. The instruments for the most part produced data relevant for baseline information concerning the nursing care received by the patients. These data, however, were found to be primarily patient-centered, direct care activities contributing only the time required for this particular segment of total patient care. Only a very minor proportion of nonpatient-centered, indirect care activities were represented. In

order to determine the staffing necessary for total patient care, data concerning nonpatient-centered, indirect nursing activities should be included.

A summary of the findings revealed that the geographic setting of the nursing home had no significant effect on the average hours of daily care received by the patient, the nursing needs or ambulatory status of the patient, the age or sex of the patient, the amount of time required for the various nursing activities, the composition of nursing personnel, the type of omission by categorical level of personnel, or the distribution of personnel by shift. The size of the home (patient population), however, did show significant differences in the average hours of daily care. The smaller homes gave more daily care in the total sample of patients and also tended to give higher average hours of care according to the nursing need and ambulatory status of the patients and levels of personnel.

A significant difference was also found in the average hours of daily care given by the categorical levels of personnel with the aide giving the greater proportion of care and the registered nurse giving the least proportion. This was true regardless of patient nursing need, patient ambulatory status, the size of the home, or the geographic location of the home.

As could be expected, the nursing needs of the patients and their ambulatory status affected the time required for the nursing activities and the average hours of daily care; the greater the nursing need, the greater the time required, and the nonambulatory patient needed more time than the ambulatory.

Of the 196 patients admitted to the project, one was dropped because of fewer than 12 hours' observation time. Seventy percent of the sample were women and 30 percent were men. The average age for the total sample was 80.77 years, with the median range of 81–85 for the women and 76–80 for the men. Classification of the patients by ambulatory status showed 65 percent were ambulatory and 35 percent were nonambulatory, with the ambulatory receiving .90 average hours of daily care and the nonambulatory 2.03 average hours of daily care. Classification by nursing need resulted in 32.8 percent with minimum needs receiving .56 average hours of daily care, 48.7 percent with moderate needs receiving 1.36 hours of daily care, and 18.5 percent with maximum needs receiving 2.41 average hours of daily care. The average hours of daily care for the total sample was 1.30 hours.

Seventy-three percent of the nursing activities observed in the project were completed by a single person and 27 percent by two or more persons resulting in two sets of mean times for completion of the activities. There are two limitations of the mean data: (a) the means are for nursing care areas rather than the nursing activities or procedures within each area, and (b) the time observed does not include the time for the procedural steps omitted.

The aide level of personnel performed in all 23 nursing care areas observed, the LPN in 19 of the 23, and the RN in 17 areas. Eighty-one percent of the nursing care rendered to the patients was given by the ancillary personnel (74 percent by aide and 7 percent by other, relatives principally); the LPN gave 12 percent, and the RN 7 percent. With the staff/patient ratio for the total sample being 8.16:100 for the aide level as compared to 1.76:100 for the RN and 1.37:100 for the LPN, the larger percentage of care given by the aide level would be expected. However, the RN was not observed to give the percentage of time one might expect from the staff/patient ratio for that level of personnel. The limitation of observing only patient-centered activities in this project could account for this difference as the role of the RN in the nursing homes is primarily one of administration and supervision of the nursing staff.

There is another limitation to consider in any comparison of level of personnel performing the nursing activities: the activities are not necessarily assigned or performed according to the nursing knowledge and skill of the various personnel levels.

The procedural steps of the nursing activities were assigned to five patient care categories for implications of quality in the nursing care as observed by the commission or omission of the steps. The categories were: Physical Needs; Care and Comfort; Psychological and Mental Needs; Cleanliness of Home and Equipment; Safe, Aseptic Techniques; and Rehabilitation and Recreation. On an overall basis, the RN apparently gave better quality care by having the highest percentage of commissions in all of the care categories except Psychological and Mental Needs; the LPN had the highest commission percentage in that category. The aide had the lowest percentage of commissions in all but the Rehabilitation and Recreation care category. The fact that the aide level had the high-

est overall commission percentage is attributed to two factors: (1) the higher staff/patient ratio, and (2) the larger amount of observed patient care was given by this level. The poorest quality of nursing care was in the category of Safe, Aseptic Techniques, with a commission percentage of less than 50 percent. The ratio of commissions to omissions was 4:1 for the total sample with the individual nursing homes varying from a low of 3:1 to a high of 6:1.

Data concerned with commissions and omissions in the nursing care given to patients in the project are limited to the procedural steps of the initiated nursing activities; recording the omission of a nursing activity was not provided for in the collection of data.

Recommendations

1. That a statistically acceptable formula for estimating omission time be developed and applied to the data according to individual nursing activities (procedures) within each nursing care area.

2. That the estimated omission time be used to redetermine the average time presented in this project and that these average times are determined on the nursing activities (procedures) rather than the nursing care areas.

3. That the average time be investigated in more depth regarding the extent to which the nursing need, the personnel level, and the single person versus the multiple person activity influence the time it takes to complete the nursing activities.

4. That the commissions and omissions in the five patient care categories be studied in depth through identification of the procedural steps most frequently omitted to determine if there is an association between the level of personnel and/or the nursing need of the patient and the type of omission.

5. That the number and levels of nursing personnel recommended for staffing a nursing home be determined by the needs of the patients rather than patient population.

6. That the validity and reliability of the criteria for classifying patients by nursing need be determined by application of the criteria to other sets of patients residing in nursing homes.

7. That the use of this methodology by an individual nursing home would be impractical from the standpoint of time, expense, operative use of the data, and the mobility of nursing personnel.

8. That the nonpatient-centered activities as well as patient-centered activities of the nursing personnel be studied in a portion of the 14 nursing homes in the Denver project. The methodology from the Division of Nursing, U.S. Public Health Service document, *How to Study Nursing Activities in a Patient Unit,* be adapted as necessary for use in nursing homes.

9. That the data from the completed study be combined with the data from the proposed study in order to provide the base data deemed necessary to the development of guidelines for minimal staffing requirements for both direct and indirect patient care as observed in nursing homes.

10. That another replication be considered with the Observer Record revised to include additional procedural steps suggested by its use in the Denver project and an ordering of the steps that would facilitate their identification for the individual nursing procedures by the observers, and with the Patient Profile revised to include the additional information felt necessary for more definitive classification of patients according to their nursing needs.

References

1. *Quantitative Measurement of Nursing Service in Nursing Homes,* Gertrude Mulaney, RN, City of Milwaukee Health Department, June 1963, p. 3.

2. "Replication is the term applied to a repetition of the identical study design among a different set of study subjects." *Better Patient Care Through Nursing Research,* Faye G. Abdellah and Eugene Levine, New York, Macmillan Company, 1966, p. 707.

3. *Minimum Standards for Nursing Homes, Homes for the Aged, and Other Similar Health Establishments.* Adopted by the Colorado State Board of Health, August 10, 1959.

   "17. 405.2 (a) The person in charge of patient care shall be a full-time employee and shall be a professional or practical nurse currently licensed in the State of Colorado.

   405.2 (c) There shall be a Colorado licensed professional or Colorado licensed practical nurse awake, dressed, and on duty at all times.

   405.2 (d) The daily minimum number of staff engaged in nursing care shall be:

   Day Shift—1 nurse, professional, practical, aide or orderly for each eight (8) patients or major fraction thereof

   Evening Shift—1 nurse, as above, for each sixteen (16) patients or major fraction thereof

   Night Shift—1 nurse, as above, for each twenty-four (24) patients or major fraction thereof."

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COLORADO STATE DEPARTMENT OF PUBLIC HEALTH
PATIENT PROFILE

NURSING HOME No.

PATIENT NAME No.

BIRTH DATE	AGE	DATE OF ADMISSION	SEX Code: Male..... 1 Female..... 2

NURSING NEED
Code: Minimum..... 1
Moderate..... 2
Maximum..... 3

PATIENT CLASSIFICATION
Code: Ambulatory..... 1
Nonambulatory..... 2

ADMITTED FROM:
Residence Code: Own..... 1
Other..... 2
If other, specify

Hospital Code: General..... 3
Special..... 4
If other, specify

Other Nursing Home..... 5

Marital Status
Code: Single..... 1
Married..... 2
Widowed..... 3
Divorced..... 4
Unknown..... 5

Religion
Code: Catholic..... 1
Protestant..... 2
Jewish..... 3
Other..... 4
Unknown..... 5

Length of Residence
Code: 1 day but less than 6 months..... 1
6 months but less than 1 year..... 2
1 year but less than 2 years..... 3
2 years but less than 5 years..... 4
Over 5 years..... 5

DIAGNOSTIC DESCRIPTION (Primary and Additional)

CURRENT MEDICAL ORDERS

EVALUATION OF PATIENT'S MENTAL AND PHYSICAL ABILITY AND ADJUSTMENT LIMITATIONS

Code: Present..... 1
Not Present... 2

MENTAL			PHYSICAL		
1. Confused		8. Bedfast		15. Requires feeding	
2. Disoriented		9. Chairfast		16. Indwelling catheter	
3. Abusive or combative		10. Wheelchair		17. Incontinent	
4. Emotional lability (cries & fusses)		11. Crutches		18. Blindness	
5. Depressed		12. Walker		19. Deafness	
6. Withdrawn		13. Requires help to walk		20. Decubitus	
7. Hallucinating		14. Requires help dressing		21. Unable to communicate	

(Form continued)

PARTICIPATION IN SOCIAL, RECREATIONAL AND RELIGIOUS ACTIVITIES

Code: Present..... 1
Not Present... 2

22. Leaves home for family, recreational and spiritual activities	
23. Attends religious service and group entertainment in home	
Partakes in passive recreation	
24. Listens to Radio	
25. Watches TV	
26. Sits in sitting room	
Provides own source of entertainment	
27. Reads	
28. Works on scrapbooks	
29. Plays solitaire	
30. Does handwork	
31. Does needlework	
32. Other diversions	
Participates in group recreations	
33. Plays cards and games	
34. Sits and talks with other patients	
35. Works on small chores in home	

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COLORADO STATE DEPARTMENT OF PUBLIC HEALTH
OBSERVER RECORD

CATHETERIZATION Area No. 02	HOME No.	OBSERVER No.	DATE:	SHIFT No.

ACTIVITY	SERVICE	PERSONNEL LEVEL
Code: Catheterization 1	Code: Given 1	Code: RN 1
Insertion of Foley catheter ... 2	Not Given 2	LPN 2
Bladder irrigation 3	Not Applicable 3	Aide 3
Emptying drainage bottle 4		Other 4

Name of Home: / Patient Name & No.										
	Patient No.									
	Activity									
	Personnel Level									
	Personnel No.									
	Total Time									
1. Assembles equipment										
2. Boils equipment										
3. Autoclaves equipment										
4. Obtains equipment presterilized										
5. Explains activity to patient										
6. Screens patient										
7. Uses bath blanket										
8. Insures cleanliness of the area										
9. Adjusts light										
10. Washes hands										
11. Opens sterile equipment										
12. Uses aseptic technique										
13. Uses aseptic hand technique										
14. Fills syringe										
15. Places urine basin										
16. Cleanses meatus										
17. Lubricates catheter										
18. Inserts catheter										
19. Injects water to fill bag										
20. Irrigates bladder										
21. Clamps or ties catheter										
22. Connects to drainage bottle										
23. Empties drainage bottle										
24. Straightens bed										
25. Positions patient										
26. Washes hands										
27. Cleans and replaces equipment										
28. Records										
29. Removes catheter										

REMARKS:

COLORADO STATE DEPARTMENT OF PUBLIC HEALTH
OBSERVER RECORD

OXYGEN THERAPY Area No. 22	HOME No.	OBSERVER No.	DATE:	SHIFT No.

ACTIVITY
Code: Cannula 1
Catheter 2
Mask 3
Tent 4
Positive pressure 5

SERVICE
Code: Given 1
Not given 2
Not applicable 3

PERSONNEL LEVEL
Code: RN 1
LPN 2
AIDE 3
Other 4

Name of Home / Patient Name & No.										
	Patient No.									
	Activity									
	Personnel Level									
	Personnel No.									
	Total Time									
1. Explains activity to patient										
2. Assembles equipment										
3. Secures tank										
4. Screens patient										
5. Places "No Smoking" sign										
6. Extinguishes candles										
7. Turns on motor										
8. Turns on oxygen valve										
9. Adjusts rate of flow										
10. Place in tent after oxygen is flowing										
11. Checks and adjusts temperature of tent										
12. Secures tent										
13. Positions and covers patient										
14. Observes vital signs										
15. Removes from tent										
16. Turns off oxygen valve and liter flow										
17. Turns off motor										
18. Checks humidifier										
19. Measures catheter										
20. Lubricates catheter										
21. Inserts catheter										
22. Checks breathing apparatus for leaks or plugs										
23. Secures breathing apparatus										
24. Records										
25. Tears oxygen tank ticket										
26. Replaces equipment										

REMARKS:

COLORADO STATE DEPARTMENT OF PUBLIC HEALTH
OBSERVER RECORD

MEDICATIONS	Area No. 12	HOME No.	OBSERVER No.	DATE:	SHIFT No.

ACTIVITY

Code: Oral	1	Intravenous	5
Intramuscular	2	Rectal	6
Subcutaneous	3	Inunction	7
Instillation	4	Topical	8

SERVICE

Code: Given	1
Not Given	2
Not Applicable	3

PERSONNEL LEVEL

Code: RN	1
LPN	2
Aide	3
Other	4

Name of Home: / Patient Name & No.										
	Patient No.									
	Activity									
	Personnel Level									
	Personnel No.									
	Total Time									
1. Washes hands		--								
2. Assembles equipment										
3. Boils equipment										
4. Autoclaves equipment										
5. Obtains presterilized equipment										
6. Checks charts for medication orders										
7. Checks medicine card for accuracy										
8. Checks medicine care for medication										
9. Checks label of bottle before preparing										
10. Checks label of bottle after preparing										
11. Uses aseptic technique										
12. Explains activity to patient										
13. Screens patient										
14. Positions patient										
15. Supervises taking of medication										
16. Cleans area with alcohol sponge										
17. Makes skin taut										
18. Injects needle at 45° angle										
19. Injects needle at 90° angle										
20. Withdraws plunger slightly from syringe barrell										
21. Selects new site and needle										
22. Instills nose drops										
23. Instills eye drops or ointment										
24. Instills ear drops										
25. Applies medication to affected area										
26. Gives rectal medication										
27. Removes screen										
28. Cleans and replaces equipment										
29. Washes hands										
30. Records										
31. Gives attention to matters important to patient										
32. Displays gentleness in handling patient										

REMARKS:

Qualifications of Project Staff

SUPERVISOR OF OBSERVERS

Basic requirements:

- Registered professional nurse;
- Currently licensed to practice in Colorado;
- Minimum of baccalaureate degree in nursing required, master's degree desired;
- At least 2 years' experience in teaching or supervision of a nursing unit in a hospital.

Her actual experience consisted of 2 years as Head Nurse and 2 years as Supervisor in general hospitals; 2 years as Clinical Instructor in professional nurse programs; and 9 years as Assistant Director, Clinical Instructor and Supervisor in an accredited school of practical nursing.

She had a baccalaureate degree in Nursing Education and a master's degree in Medical-Surgical Nursing. She was well qualified for her responsibilities as Supervisor of Observers.

NURSE OBSERVER

Basic requirements:

- Registered professional nurse;
- Currently licensed to practice in Colorado;
- At least 2 years of satisfactory hospital experience within the last 3-year period in staff or supervisory positions;
- Preference given to nurses with additional educational preparation beyond their basic nursing program and supervisory, teaching, or head nurse experience.

In the group of seven nurse observers, there were two with baccalaureate degrees, one of whom had begun work on her master's degree; three of the others had begun work on their baccalaureate degree; six of the group had Head Nurse or Supervisor experience; one had experience as Assistant Director of Nursing Service; two had some nursing home experience; and one had public health nursing experience. They were well qualified for their responsibilities as observers.

STATISTICAL CONSULTANT

Basic requirements:

- Baccalaureate degree in Statistics, master's degree desirable;
- At least 1 year of experience as a statistician in the health field;
- Experience in research desirable.

The Statistical Consultant had a baccalaureate degree in Statistics and during his part-time employment with the project completed his master's degree. His experience prior to the project was with the Colorado Department of Welfare as a statistician concerned with medical care programs.

SECRETARY

Basic requirements:

- Graduate of high school;
- At least 3 years of progressively responsible clerical or stenographic experience including 1-year's experience as clerk-stenographer or secretary that has provided familiarity with a medical option;
- Ability to maintain complex subject matter filing system;
- Experience in statistical tabulation;
- Equipment used: typewriter, dictaphone, and adding machine;
- Takes and transcribes dictation.

The secretary had all of the requirements as described and her experience included 4 years in the health field, considerable experience with statistical data, and clerical, stenographic, and secretarial experience.

Ambulation Classification

DEFINITIONS

Ambulatory: An ambulatory patient is one who is able to leave the nursing home without assistance in case of emergency.

Nonambulatory: A nonambulatory patient is one who requires assistance to leave the nursing home in case of an emergency.[1]

Additional clarification of the definitions as stated above were developed and used by the Project Director and Supervisor to classify the patients in the Denver project. These were verified by the Milwaukee Project Director as being acceptable and not contrary to the meaning of definitions used in the Milwaukee study.

Denver Criteria

Ambulatory: Can ambulate by himself, can get out of bed by himself, can get outdoors by himself, by walking, by wheelchair, by walker, cane, or crutches, or by prosthesis.

Nonambulatory: Needs human assistance to ambulate; totally dependent upon others for locomotion.

Nursing homes in the State of Colorado were required for many years to state on Quarterly Reports for various State agencies the number of patients who were ambulatory, semi-ambulatory, and nonambulatory. Upon exploration, the only one of the above terms defined in the "Minimum Standards for Nursing Homes, Homes for the Aged, and Other Similar Health Establishments," adopted by the Colorado State Board of Health, August 10, 1959, was "ambulatory." It read: "Ambulatory shall mean a person who, unaided, is physically and mentally capable of walking a normal path to safety, including the ascent and descent of stairs as defined by the National Board of Fire Underwriters." The most recent standards, adopted on May 10, 1965, have no reference to these terms.

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[1] *Quantitative Measurement of Nursing Service in Nursing Homes,* Gertrude Mulaney, RN, City of Milwaukee Health Department, June 1963, Appendix, p. 13.

Criteria for Patient Nursing Need

In developing the criteria for determining the nursing needs of the nursing home patient, five broad categories were considered:

1. Diagnostic Description (primary diagnosis and additional as stated on patient's chart);
2. Nursing Activities (medications, special treatments, special diets, personal care, preventive and restorative measures, etc.);
3. Physiological Factors (vision, hearing, bowel and bladder function, mobility function, communication, etc.);
4. Psycho-Social Factors (emotional and social behavior);
5. Rehabilitative Factors (functional ability, both mental and physical).

MAXIMUM

Diagnostic Description

Primary diagnosis considered a major systemic disorder with additional contributing diagnoses and accompanied by numerous related disabilities requiring direct or supervisory professional nursing service on a continuous basis.

Nursing Activities

- Medications given for both supportive and specific measures (a) requiring careful observation by the professional nurse as to response and effect; and (b) requiring professional knowledge and judgment in administration
- Special therapeutic measures: dressings, oxygen therapy, etc.
- Special diets, need for supervision and/or assistance in eating
- Complete personal care
- Utilization of both preventive and restorative nursing measures

Physiological Factors

- Either restricted, too ill, or too disabled to move without assistance, may have some degree of paralysis
- Sensory deprivation, loss of vision and/or hearing
- Decubiti
- Incontinence—bowel and/or bladder
- Electrolyte imbalance
- Physical limitation for communication

Psycho-Social Factors

- Confusion, disorientation, excitation, marked depression, anxiety, and other emotional disturbances that influence nursing requirements
- Cannot or does not interact socially
- Communication—poor or nil
- Memory loss, inappropriate behavior

Rehabilitative Factors

- Retention and/or restoration of physical function necessary (may be improbable for restoration but probable for retention)
- Psychological support—essential; therapy may be necessary
- Other therapies; i.e., physical, occupational, and speech

MODERATE

Diagnostic Description

Primary diagnosis of a systemic disorder; may have additional contributing diagnoses and may be accompanied by related disabilities or limitations requiring supervisory professional nurse service with some direct service on a continuous basis.

Nursing Activities

- Medications given for both supportive and specific measures (a) requiring careful observation by the professional nurse as to response and effect; and (b) requiring professional knowledge and judgment in administration
- Occasional therapeutic measures, dressings, oxygen, etc.
- Modified diet, usually does not require assistance in eating
- Supervised personal care
- Supervised maintenance of functional activities, teaching patient how to perform his activities of daily living
- Bowel and/or bladder retraining program

Physiological Factors

- Some limitations of movement; may require assistance in daily living functions; i.e., dressing, getting from bed to wheelchair or chair, or walking

- Limited vision and/or hearing, some sensory deprivation
- Incontinence—ranges from occasional to complete in bowel and/or bladder, but continent most of the time
- May have some communication limitations (physical)

Psycho-Social Factors
- At times emotionally unstable, confused, depressed, disoriented
- Social interaction usually good
- Communication and participation with other patients usually good
- Occasional inappropriate behavior

Rehabilitative Factors
- Restoration of physical function possible with teaching and retraining program
- Understanding emotional support necessary
- May have another therapy; i.e., physical, speech, or diversional

MINIMUM

Diagnostic Description

Primary and/or additional diagnoses indicate systemic disorder of nondisabling level most of the time requiring professional nurse supervision mainly for observation and evaluation of nursing care to meet patient needs.

Nursing Activities
- Medications may be mainly supportive but still require professional nurse administration and observation for response and effect
- Modified diet, needs no assistance in eating
- Minor assistance in personal care
- May need restorative nursing measures for increasing and strengthening functional capacity

Physiological Factors
- May have some degree of vision, hearing, or sensory loss
- May have slight limitation in movement, usually does not require assistance
- Continent

Psycho-Social Factors
- May exhibit *mild* confusion or depression occasionally
- Communicates well
- Able to make decisions regarding his needs
- Social interaction good

Rehabilitative Factors
- Mainly supportive

Job Descriptions of Nursing Personnel in Nursing Homes

All of the 14 nursing homes in the project employed nursing personnel in each of the four levels:

(1) Director of Nursing (RN)
(2) Charge Nurse (RN)
(3) Licensed Practical Nurse (LPN)
(4) Auxiliary Personnel (Aide or Orderly)

Each home was requested to submit the job descriptions they used in their homes. The descriptions varied greatly in structure as well as content. Some were lists of tasks in general, and according to shift; some enumerated qualification; i.e., education, physical, personal, and experience; some included definitions; some presented functions, both general and specific; and others had all of the components usually prescribed for a job description. The job descriptions presented here are a compilation, by the Supervisor, of all of the job descriptions submitted. Observation of each of these levels in the homes showed only slight variations of functions within the individual levels, and the descriptions can be generally applied to all of the nursing homes in the project. Variations are mentioned where considered necessary.

DIRECTOR OF NURSING SERVICE (RN)

Definition: "The 'practice of professional nursing' shall mean the performance for compensation of any act in the observation or care of the ill, injured, or infirm or in the maintenance of health or prevention of illness of others or in the supervision and teaching of other personnel or the administration of medicines and treatments as prescribed by

a person licensed to practice medicine or dentistry in this state, requiring substantial specialized judgment and skill and based on knowledge and application of the principles of biological, physical, and social sciences. The foregoing shall not be deemed to include acts of diagnosis or prescription of therapeutic or corrective measures." [2]

Qualifications:

- Graduation from an accredited school of professional nursing;
- Currently licensed by the Colorado State Board of Nursing to practice professional nursing;
- Demonstrates knowledge of and ability to apply principles of administration supervision, and teaching;
- Demonstrates knowledge of and ability to apply basic principles of nursing care;
- Demonstrates leadership ability;
- Maintains an up-to-date knowledge of current trends and new developments;
- Experience and/or education in the care of the geriatric patient and restorative nursing care desirable;
- Ability to work effectively with all levels of personnel;
- At least one year of experience in supervision and/or administration preferred.

Personal Requirements:

- Desirable character and personality traits;
- Good emotional and physical health;
- Good interpersonal relationships;
- Effective communication skills;
- Acceptable attitudes and beliefs;
- Tactful and courteous;
- Genuine interest in geriatric nursing;
- Personal appearance should be example for other personnel;
- Mature and loyal.

Functions:

- Assumes responsibility for nursing services, evaluates the needs for total patient care, directs nursing care to insure a safe and comfortable environment for patients and staff;
- Participates in selection and placement of prospective patients in terms of service available for patient needs;
- Assigns duties and delegates responsibilities to nursing personnel according to their abilities;
- Teaches, counsels, supervises, directs, and evaluates performance of all levels of nursing personnel;
- Participates in the selection, hiring, and dismissal of nursing personnel;
- Assists in planning the budget for nursing service including recommendation of the number and type of nursing personnel to be employed;
- Designates responsible professional nurse to be in charge of nursing service during the absence of the director;
- Coordinates nursing service with other patient care services such as occupational and physical therapies;
- Formulates, implements, and evaluates nursing care plans;
- Evaluates information to be shared with other nursing personnel and allied services for continuity of care;
- Conducts inservice education classes for nursing personnel and orientation programs for all new nursing personnel;
- Assesses nursing resources that may be utilized in planning better patient care;
- Has basic knowledge of Colorado State laws of nursing practice;
- Encourages staff development and professional growth;
- Maintains good interpersonal relationships with patients, nursing personnel, allied professional groups, and the public;
- Participates in the development, interpretation, implementation, and evaluation of patient care policies;
- Gives direct nursing care as needed;
- Advises on nursing equipment, supplies, and facilities;
- Participates in and/or attends professional organizations' activities, institutes, and workshops.

CHARGE NURSE (RN)

Definition: "The 'practice of professional nursing' shall mean the performance for compensation of any act in the observation or care of the ill, injured or infirm or in the maintenance of health or prevention of illness of others or in the supervision and teaching of other personnel or the administration of medicines and treatments as prescribed by a person licensed to practice medicine or dentistry

[2] Colorado Professional Nursing Practice Act, April 1967, p. 4.

in this state, requiring substantial specialized judgment and skill and based on knowledge and application of the principles of biological, physical and social sciences. The foregoing shall not be deemed to include acts of diagnosis or prescription of therapeutic or corrective measures." [3]

Qualifications:

- Graduation from an accredited school of professional nursing;
- Currently licensed by the Colorado State Board of Nursing to practice professional nursing;
- Demonstrates knowldege of and ability to apply basic principles of nursing care;
- Evidence of interest in continuous professional growth;
- Experience and/or education in the care of the aged, chronically ill, restorative nursing care, and supervision desirable;
- One or more year's experience as a staff nurse preferred.

Personal Requirements:

- Desirable character and personality traits;
- Good emotional and physical health;
- Qualities of leadership;
- Good grooming;
- Good interpersonal relationships;
- Effective communication skills;
- A genuine interest in and respect for her fellow man.

Functions:

The following functions may be performed by a registered professional nurse serving in the role of a supervisor or charge nurse with responsibility for nursing care and management of a nursing unit or units:

- Supervises and evaluates work performance of nursing personnel and auxiliary workers related directly or indirectly to patient care;
- Periodically assesses the total needs of the patient and develops nursing plans for meeting the patient needs;
- Assigns duties and delegates responsibility to staff personnel for provision of patient care;
- Maintains acceptable standards of nursing practice;
- Assists in orientation and training of new nursing personnel;
- Assists in organization and teaching of inservice education programs for nursing personnel;
- Assists in developing organizational plans as they relate to nursing, including work schedules, policies, and review of nursing procedures;
- Responsible for interpretation and execution of physician's orders;
- Responsible for total patient care within the unit and assists with direct care when necessary;
- Maintains good interpersonal relationships with patients, coworkers, allied professional groups, and the public;
- Makes decisions in emergency situations and practices first aid measures;
- Responsible for accurate observations, evaluations, and reporting of patient's symptoms, reactions, and progress to director of nursing service, administrator, physician in charge, and/or coworkers;
- Orders supplies and equipment for units;
- Makes general interpretation of home rules and policies to coworkers, allied professional groups and public;
- Assists in making a nursing diagnosis and implementing nursing care plans through:
  - Evaluating the patient's emotional needs and the means by which the patient manifests these needs;
  - Giving attention to the patient's needs through recognition and acceptance of these needs;
  - Fostering self-respect and self-esteem by accepting the patient's behavior as symptomatic of age and illness;
  - Considering the forces that mold social and cultural traits in the geriatric patient;
  - Using reassurance and empathy;
  - Using communication skills, both verbal and nonverbal;
  - Guiding patient toward more rational and socially acceptable behavior;
  - Helping to provide a healthy emotional environment for the patient;
  - Recognizing the patient's physical limitations and utilizing measures to prevent additional limitations;
  - Assisting in the implementation of restorative nursing care measures that enables the patient to progress from a state of dependency to one in which he reaches his maximum level of self-sufficiency;

[3] Colorado Professional Nursing Practice Act, April 1967, p. 4.

- Assisting in the use of individualized nursing measures to alleviate patient discomfort;
- Recognizing the patient's spiritual needs and respect for his beliefs; encourages patients to participate in spiritual functions and assists in spiritual care as necessary.

LICENSED PRACTICAL NURSE (LPN)

Definition: "The 'practice of practical nursing' means the performance for compensation of selected acts in the care of the ill, injured or infirm under the direction of a registered professional nurse or a licensed physician or a licensed dentist; and not requiring the specialized skill, judgment and knowledge required in professional nursing." [4]

Qualifications:

- Graduation from a national or State-approved school of practical nursing;
- Currently licensed by the Colorado State Board of Licensed Practical Nurse Examiners on the basis of training in a National or State-approved school of practical nursing, or on the basis of equivalent credentials approved by the Colorado State Board of Nurse Examiners;
- Previous experience in medical nursing, geriatric nursing and/or nursing home preferred.

Personal Requirements:

- Desirable character and personality traits;
- Ability to maintain good interpersonal relationships;
- Ability to communicate with others;
- Ability to give as well as follow verbal and written instructions;
- Demonstrates leadership potential (possesses qualities of leadership, good judgment, etc.);
- Good emotional and physical health;
- Good grooming;
- A genuine interest in and respect for the geriatric patient.

Functions:

The following functions may be performed by licensed practical nurses who work under the supervision of a registered professional nurse and/or licensed physicians:

Performs nursing care such as:

- Assists with direct patient care;
- Administers selected medicines and treatments;
- Practices first aid measures;
- Assists physicians and professional nurses in care of patients during examinations, treatments, etc.;
- Provides preparation and after care of equipment used in nursing procedures and/or treatments;
- Practices principles of asepsis during administration of sterile procedures and/or handling sterile equipment;
- Employs good principles of nursing practice;
- Provides nursing care in conformance with recognized nursing techniques and procedures, established standards, and administrative policies.

Has responsibilities for nursing care and management of nursing unit:

- Accurate observing, recording, and reporting of patient's symptoms, reactions, and progress;
- Executing physician's orders as directed;
- Supervising auxillary personnel in basic nursing care and procedures;
- Maintaining accurate records and reports;
- Reporting any significant change in patient's mental and physical status to supervisor, director of nurses, and/or physician in charge;
- Giving and receiving unit report of patients;
- Assisting professional nurse in evaluating work performance of auxiliary personnel;
- Assisting professional nurse with and participating in inservice education programs;
- Checking and ordering supplies and equipment;
- Having a general knowledge and understanding of home rules and policies;
- Working with other medical personnel such as nutritionists, laboratory personnel, occupational and physical therapists, to provide for the patient's total needs and continuity of care;
- Assisting in making a nursing diagnosis and implementing nursing care plans through:
  - Developing an awareness and a beginning understanding of the patient's emotional needs and the means by

[4] The Practical Nursing Practice Act. Article 3, Chapter 97, Colorado Revised Statutes, 1953, as amended, p. 1.

which the patient manifests these needs;
- Giving attention to the patient's needs through recognition and acceptance of these needs;
- Fostering self-respect and self-esteem by accepting the patient's behavior as symptomatic of age and illness;
- Considering forces that mold social and cultural traits in the geriatric patient;
- Using reassurance and empathy;
- Using communication skills, both verbal and nonverbal;
- Guiding patient toward more rational and socially acceptable behavior;
- Helping provide a healthy emotional environment for the patient;
- Recognizing the patient's physical limitations and utilizing measures to prevent additional limitations;
- Assisting in the implementation of restorative nursing care measures that enables the patient to progress from a state of dependency to one in which he reaches his maximum level of self-sufficiency;
- Assisting in the use of individualized nursing measures to alleviate patient discomfort.

AUXILIARY PERSONNEL: AIDE OR ORDERLY

Definition: Auxiliary personnel are persons employed and trained to perform tasks that involve specific services for patients, delegated by the RN or LPN, which are supportive and complementary to nursing practice.

Qualifications:

- Education: varies from completion of elementary grades to completion of high school or equivalent;
- Experience: ranges from none to preparation in basic nursing procedures in an organized preservice course under supervision and direction of a registered professional nurse and/or a licensed physician;
- Mature person having good physical and mental health;
- Be able to speak English correctly and write legibly;
- Be able to accept correction and close supervision;
- Willingness to perform a variety of simple repetitive tasks, may involve unpleasant conditions;
- Patience and tact;
- Ability to maintain an understanding attitude to patients;
- Ability to follow written and oral instructions;
- Ability to make simple reports;
- Desirable personal and character qualifications;
- Acceptable personal grooming and cleanliness;
- Ability to acquire knowledge of and develop skills in simple nursing procedures.

Functions:

- Provides suitable environment for patients by giving attention to cleanliness, ventilation, lighting, furniture arrangements, and reporting of needed repairs and supplies;
- Cares for patients in a manner conducive to their comforts and safety by giving attention to the general health care of patients by assistance or guidance to insure their cleanliness, grooming, rest activity, nourishment, and elimination;
- Preserves the dignity and self-respect of all patients at all times;
- Keeps alert to patient's condition, reporting any and all observed changes in patient's attitude, appearance, actions, and general condition to RN or LPN;
- Participate in formal or informal inservice education;
- Practices confidentiality regarding patients and nursing care activities;
- Practices conservation of equipment and supplies, keeping them clean and ready for use;
- Performs selected nursing procedures where a professional degree of evaluative judgment is not required and that are delegated by the RN or LPN;
- Performs other duties as assigned;
- Participates in diversified recreational and social activities;
- Practices first aid measures as applicable;
- Recognizes spiritual needs of patients and respects their religious beliefs.

Categories of Nursing Care[5]

"Nursing care of patients was evaluated according to five general categories of care when needed on the basis of the following criteria: (1) whether the following types of nursing care were observed to take place or not to take place; (2) the frequency and repetition of activities if indicated; (3) the level of nursing personnel performing the activity.

"BASIC ASSUMPTION:

An evaluation of minimum quality of nursing care is based on the recognized standard needs of the mentally adjusted patient. The desirable quality of nursing offered in good standardized practice does not deviate because a patient may be unconscious or senile and therefore unaware of his needs.

"SPECIFIC DETAILS:

"Care Category A: Physical Needs, Care, and Comfort:

- Accompanies or assists the patient to and from the bathroom or commode, the shampoo room, the dining room, the weighing room; in and out of the bed, chair and wheelchair; in dressing and undressing.
- Checks the temperature of water during bathing or showering; protects ears and eyes; washes and dries the body well; supervises cleanliness of hands and body; uses bath blankets.
- Observes for breaking down of skin and takes measures for prevention of decubiti through application of lotion; use of foam rubber and sheepskin; prevention of pressure; frequent turning of patient; use and care of diapers; tightening of under sheets.
- Supervises nutritional intake through serving trays; arranging food; offering liquids and nourishment; feeding helpless patient; elevating head of bed; supervising special diets.
- Takes special precautions to assure safety by using safety bath mats; locking wheelchairs; staying with patient in shower; preventing patient from falling; using hand and side rails; making signal bell available; using Hoyer lift.
- Checks care and condition of patient during sleeping hours.
- Provides personal care through combing, brushing, braiding, curling and grooming; shaving with cream and the appropriate tool; cleaning, manicuring and polishing nails.
- Provides comfort for patient through attention to proper ventilation and warmth; maintaining prescribed temperature; use of robe and slippers; closed windows during bathing; adjusting ventilation.
- Provides elementary prevention measures in field of physiotherapy through attention to body positioning and alignment, bed positioning; using pillows and sandbags for support.
- Evaluates patient care through obtaining medical orders from physician on his rounds; reviewing medical orders; reviewing patient's condition; reporting symptoms on unusual changes to the charge nurse, or to the physician; assisting physician with treatments.
- Promotes rehabilitation through exercising arms, legs; walking patient; encouraging independence, self-reliance and ambulation in relation to physical care procedures.
- Records patient care.

"Care Category B: Psychological and Mental Needs:

- Screens patients during procedures; screens dying patients from other home patients.
- Answers summons of patient quickly.
- Displays gentleness in handling patient.
- Shows considerate attention to the individuality of patient through respecting his preferences, needs, and things important to him; calling clergyman, relatives, social or health agency.
- Encourages patient through conversing with him; explaining procedures to him; stimulating a feeling of pride in his appearance.

[5] Quoted with permission of the author from *Quantitative Measurement of Nursing Service in Nursing Homes*, Part II, Appendix, Gertrude Mulaney, RN, City of Milwaukee Health Department, June 1963, pp. 35-40.

- Encourages spiritual participation and is attentive to individualized spiritual needs.
- Reassures patient; remains objective to his complaints; demonstrates sympathetic understanding of him.

"Care Category C: Cleanliness of Home and Equipment:

- Changes, removes, and replaces bedding, blankets, and diapers according to good nursing procedure.
- Protects bed and patient's clothing during activity.
- Assembles necessary equipment for activity.
- Empties, cleans, and replaces equipment used in activity such as emesis basins, bedpan or urinals; covers bedpan or urinal.
- Strips bed and collects personal belongings of discharged or expired patient.

"Care Category D: Safe, Aseptic Techniques:

- Washes hands between the care of patients and before and after the activity that is performed.
- Takes cardinal signs according to proper technique which includes restricting hot or cold fluid ten minutes prior to taking oral temperature; using the appropriate thermometer; observing mercury level; using proper length of time for measurement; cleaning thermometers.
- Takes and records blood pressure accurately.
- Prepares oral, subcutaneous, and intramuscular medications with proper technique inclusive of verification of orders; identification of correct medicine; use of proper method of preparation; correct method in administration; accurate recording.
- Gives treatments such as enemas, catheterizations, bladder irrigations, vaginal douches, and colostomy irrigations according to a technique prescribed. This includes preparation of solutions according to specific medical orders; testing of temperature of solution; use of appropriate cleanliness or asepsis; administration of treatment with attention to amount and pressure of solutions; positioning of patients; proper recording; appropriate care and reattachment of equipment utilized.
- Changes or reapplies dressings, compresses, heat lamps according to aseptic techniques and the specific needs of patients.
- Tests urine with designated method accurately and records results.
- Utilizes ice or hot water bags safely.
- Administers oxygen according to prescribed technique with specific attention to evaluation of patient's orders and needs; use of equipment; anatomical and physiological requirements of patient in the administration of oxygen; safety considerations; accurate recording.
- Gives care which is appropriate for the specific needs of the acutely ill or comatose patient through the careful utilization of suctioning machines, gavage methods, accurate recording.

"Care Category E: Rehabilitation and Recreation:

- Encourages and assists patient in occupational therapy.
- Initiates patient activity and encourages him to participate in recreation activities such as radio and television.
- Encourages ambulation and walks with patient.
- Assists patient in crutch walking or in using walker.
- Encourages patient to be up and dressed in dress, or shirt, trousers, and shoes.
- Encourages self-care."

Procedures for Deriving Proportional Samples for Denver

The matching was done as follows:
Milwaukee patients [6] were categorized as to ambulatory status and nursing need:

	Minimum	Moderate	Maximum	Total
Ambulatory	20	21	1	42
Nonambulatory	0	12	44	56
Total	20	33	45	98

Expressed as percentages of the total Milwaukee sample, this was:

	Minimum	Moderate	Maximum	Total
Ambulatory	20.4	21.4	1.0	42.8
Nonambulatory	0.0	12.2	45.0	57.2
Total	20.4	33.6	46.0	100.0

To make the Denver samples correspond to these percentages in each cell, patient cards were deleted where necessary. This deletion was done on a random basis (by blindly pulling IBM cards from each group).

This produced a *total proportional Denver* sample with the following numbers of patients in each category:

	Minimum	Moderate	Maximum	Total
Ambulatory	16	17	1	34
Nonambulatory	0	9	35	44
Total	16	26	36	78

The resulting *proportional under 91 Denver sample* had the following numbers of patients in each category:

	Minimum	Moderate	Maximum	Total
Ambulatory	8	8	0	16
Nonambulatory	0	3	16	19
Total	8	11	16	35

Summary of Denver vs. Milwaukee analyses on average hours of daily care received by patients:

	Milw. overhead time incl.	Milw. overhead time excl.	Denver homes under 91 minus Milw. overhead time	Proportional under 91 sample	Proportional total sample
Ambulatory	.01	[1]NS	NS	NS	NS
Nonambulatory	.01	NS	NS	NS	NS
Maximum	NS	NS	NS	NS	NS
Moderate	NS	NS	NS	NS	NS
Minimum	.001	.05	NS	NS	NS
Total	.001	.001	NS	NS	NS

[1] NS = not significant.

[6] Only the random sample of patients was used.

Table 1.—Characteristics of study patients by age, ambulatory status, nursing need, and sex according to geographic area

Age	Ambulatory Min. M	Ambulatory Min. F	Ambulatory Mod. M	Ambulatory Mod. F	Ambulatory Max. M	Ambulatory Max. F	Nonambulatory Min. M	Nonambulatory Min. F	Nonambulatory Mod. M	Nonambulatory Mod. F	Nonambulatory Max. M	Nonambulatory Max. F	Total M	Total F
City														
Below 65	1	—	—	—	—	—	—	—	—	2	—	—	1	2
65–70	—	1	—	1	—	—	—	—	—	—	—	2	—	4
71–75	3	2	2	—	—	—	—	—	—	—	—	2	5	4
76–80	—	5	1	3	—	—	—	—	—	1	—	2	1	11
81–85	1	4	3	9	—	—	—	—	1	2	—	1	5	16
86–90	1	4	—	5	—	—	—	—	2	—	—	2	3	11
91–95	1	3	—	4	—	—	—	—	1	1	—	1	2	9
96–100	—	1	—	1	—	—	—	—	2	—	—	1	2	3
Total	7	20	6	23	—	—	—	—	6	6	—	11	19	60
Metropolitan														
Below 65	3	1	—	1	—	—	—	—	1	—	—	1	4	3
65–70	4	1	1	2	—	—	—	—	—	1	—	—	5	4
71–75	—	4	—	1	—	—	—	—	3	1	1	—	4	6
76–80	1	1	2	1	—	—	—	—	1	1	—	1	4	4
81–85	3	2	2	7	—	1	—	—	—	5	1	9	6	24
86–90	1	5	—	5	—	—	—	—	—	2	—	1	1	13
91–95	—	1	—	1	—	—	—	—	—	2	1	1	1	5
96–100	1	—	1	—	—	—	—	—	—	—	—	—	2	—
Total	13	15	6	18	—	1	—	—	5	12	3	13	27	59
Rural														
Below 65	—	—	1	1	—	—	—	—	—	—	—	1	1	2
65–70	1	—	—	3	—	—	—	—	—	—	—	—	1	3
71–75	1	1	—	—	—	—	—	—	—	—	1	—	2	1
76–80	—	—	—	—	—	—	—	—	1	1	1	1	2	2
81–85	1	2	—	2	—	—	1	—	—	—	—	3	2	7
86–90	—	1	2	—	—	—	—	—	—	—	—	—	2	1
91–95	—	1	1	—	—	—	—	—	1	—	—	1	2	2
96–100	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	3	5	4	6	—	—	1	—	2	1	2	6	12	18
Overall total	23	40	16	47	—	1	1	—	13	19	5	30	58	137

Table 2.—Characteristics of study patients by age, ambulatory status, nursing need, and sex according to patient population

Age	Ambulatory Min. M	Ambulatory Min. F	Ambulatory Mod. M	Ambulatory Mod. F	Ambulatory Max. M	Ambulatory Max. F	Nonambulatory Min. M	Nonambulatory Min. F	Nonambulatory Mod. M	Nonambulatory Mod. F	Nonambulatory Max. M	Nonambulatory Max. F	Total M	Total F
Over 91 beds														
Below 65	2	1	1	2	—	—	—	—	1	—	—	1	4	4
65–70	5	2	1	6	—	—	—	—	—	—	—	1	6	9
71–75	2	5	1	—	—	—	—	—	3	1	2	1	8	7
76–80	1	4	2	2	—	—	—	—	2	2	—	1	5	9
81–85	4	5	4	10	—	1	1	—	1	6	—	9	10	31
86–90	2	6	2	6	—	—	—	—	1	2	—	2	5	16
91–95	—	3	—	2	—	—	—	—	2	2	1	1	3	8
96–100	1	1	1	—	—	—	—	—	1	—	—	—	3	1
Total	17	27	12	28	—	1	1	—	11	13	3	16	44	85
Under 91 beds														
Below 65	2	—	—	—	—	—	—	—	—	2	—	1	2	3
65–70	—	—	—	—	—	—	—	—	—	1	—	1	—	2
71–75	2	2	1	1	—	—	—	—	—	—	—	1	3	4
76–80	—	2	1	2	—	—	—	—	—	1	1	3	2	8
81–85	1	3	1	8	—	—	—	—	—	1	1	4	2	16
86–90	—	4	—	4	—	—	—	—	1	—	—	1	1	9
91–95	1	2	1	3	—	—	—	—	—	1	—	2	2	8
96–100	—	—	—	1	—	—	—	—	1	—	—	—	1	2
Total	6	13	4	19	—	—	—	—	2	6	2	14	13	52
Overall Total	23	40	16	47	—	1	1	—	13	19	5	30	58	137

Table 3.—Mean time [1] needed to complete each of the nursing care areas by personnel level and by patient ambulatory status and nursing need

Area	Overall mean	Personnel level				Ambulatory status		Nursing need		
		RN	LPN	Aide	Other	Amb.	Nonamb.	Minimum	Moderate	Maximum
Elimination	3.90	3.27	3.44	3.91	4.88	3.46	4.32	3.49	3.44	5.38
Catherization	3.75	8.19	4.86	3.23	0.00	8.75	3.50	2.00	3.86	3.72
Daily care	3.37	0.97	2.21	3.70	8.64	2.64	4.07	1.07	3.71	3.96
Bathing	15.67	0.00	12.00	15.64	20.13	15.84	15.50	15.32	15.79	15.61
Bed making	4.91	2.75	7.68	4.87	4.64	4.61	5.34	4.73	4.86	5.33
Care of skin	5.32	6.25	5.44	5.28	0.00	4.58	5.38	11.50	5.76	4.96
Care of hair and face	3.28	0.00	0.46	2.97	7.88	3.74	2.89	4.41	3.49	2.52
Oral hygiene	2.23	1.25	5.17	2.14	2.56	1.93	2.49	0.88	2.23	2.34
Care of nails	4.45	4.25	2.13	4.38	6.75	4.35	4.62	3.71	4.69	4.46
Rehabilitation and recreation	5.43	1.96	2.37	3.25	10.25	4.84	6.23	4.55	6.12	4.41
Food and nourishment	2.29	1.16	1.91	2.45	1.23	1.40	3.65	1.27	1.78	5.30
Medications	1.81	1.79	1.89	1.51	4.75	1.75	1.90	1.47	1.89	2.13
Cardinal symptoms	2.35	1.34	1.65	3.19	1.38	2.11	2.58	2.01	2.23	2.66
Therapeutic measures	5.77	9.10	4.67	4.83	7.92	5.54	5.96	2.50	6.15	6.05
Urine tests	2.87	1.80	2.38	3.02	0.00	2.87	2.86	3.03	2.79	3.88
Enema	8.20	0.00	7.38	8.42	0.00	8.71	7.96	0.00	9.00	7.31
Care of colostomy or ileostomy	6.57	0.00	0.00	6.57	0.00	6.57	0.00	0.00	6.57	0.00
Associated nursing care function	0.63	0.57	0.61	0.67	2.52	0.62	0.65	0.58	0.65	0.67
Weighing patient	1.29	0.00	0.00	1.29	0.00	1.29	0.00	0.95	1.54	0.00
Gavaging patient [2]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Female procedures	1.83	0.00	0.00	1.83	0.00	0.00	1.83	0.00	1.83	0.00
Oxygen therapy	2.75	0.25	0.75	3.65	0.00	0.75	3.08	0.00	0.75	3.08
Care of critically ill	3.25	4.00	0.00	2.50	0.00	0.00	3.25	0.00	3.25	0.00
Preparing body after death [2]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Miscellaneous	1.06	0.82	0.69	1.14	1.22	0.98	1.20	1.01	1.02	1.28

[1] Includes only single person activities.
[2] No activities observed.

Table 4.—Mean time [1] needed to complete each of the nursing care areas by geographic area and patient population of the study homes

Area	Overall mean	Geographic area			Patient population	
		City	Metro	Rural	Under 91	Over 91
Elimination	3.90	4.22	3.52	4.00	4.12	3.74
Catherization	3.75	4.08	3.06	4.46	4.47	3.06
Daily care	3.37	3.98	3.15	2.44	3.66	3.13
Bathing	15.67	15.32	15.54	18.41	16.54	15.16
Bed making	4.91	4.92	5.04	4.40	5.28	4.70
Care of skin	5.32	5.87	5.07	4.53	4.97	5.56
Care of hair	3.28	3.27	2.82	4.82	3.51	3.12
Oral hygiene	2.23	2.48	1.96	2.44	2.32	2.18
Care of nails	4.45	4.38	5.11	1.33	6.25	3.63
Rehabilitation and recreation	5.43	5.36	5.71	4.80	5.30	5.51
Food and nourishment	2.29	2.13	2.05	3.97	2.97	1.81
Medications	1.81	1.81	1.85	1.69	2.21	1.60
Cardinal symptoms	2.35	2.05	2.10	3.21	1.99	2.57
Therapeutic measures	5.77	6.20	6.39	2.85	4.56	6.25
Urine tests	2.87	2.61	3.18	3.40	2.73	2.97
Enema	8.20	9.92	7.40	0.00	7.23	9.28
Care of colostomy or ileostomy	6.57	0.00	6.57	0.00	0.00	6.57
Associated nursing care function	0.63	0.73	0.60	0.48	0.71	0.59
Weighing patient	1.29	0.97	1.94	0.00	1.25	1.35
Gavaging patient [2]	0.00	0.00	0.00	0.00	0.00	0.00
Female procedures	1.83	1.83	0.00	0.00	0.00	1.83
Oxygen therapy	2.75	0.75	0.00	3.08	0.00	2.75
Care of critically ill	3.25	0.00	0.00	3.25	0.00	3.25
Preparing body after death [2]	0.00	0.00	0.00	0.00	0.00	0.00
Miscellaneous	1.06	1.05	1.21	0.86	1.28	0.96

[1] Includes only single person activities.
[2] No activities observed.

Table 5.—Total minutes of direct care [1] in observation period [2] according to nursing care areas for each home in the study

Home number	01	02	03	04	05	06	07	08	09	10	11	12	13	14	Total per area
Number of patients	06	18	[3] 19	[3] 25	06	[3] 25	12	24	06	18	06	12	06	12	
Nursing care areas															
01 Elimination	200.25	201.00	120.25	366.25	144.50	324.00	159.00	162.50	60.75	120.75	143.75	120.25	57.75	231.50	2,412.50
02 Catherization	225.25	48.75	40.75	115.25	0.00	0.00	153.50	158.25	0.00	0.00	28.25	87.20	0.00	0.00	857.20
03 Daily care	696.50	918.75	792.75	1,196.47	586.75	1,016.75	994.25	1,707.75	284.75	437.00	355.00	1,025.25	596.50	578.25	11,186.72
04 Bathing	176.00	407.25	348.75	604.75	213.50	514.00	414.25	537.25	82.75	242.75	93.75	381.00	236.00	240.25	4,492.25
05 Bed making	85.25	286.50	419.75	397.50	143.50	290.25	268.60	413.25	97.25	340.75	78.50	259.25	84.25	195.50	3,360.10
06 Care of skin	19.00	58.75	60.00	445.22	31.25	85.75	57.00	613.50	11.00	15.75	44.00	166.50	42.25	56.75	1,706.72
07 Care of hair, face	89.50	88.25	100.00	151.75	64.75	172.75	86.25	99.50	47.50	192.75	8.00	69.00	52.50	183.00	1,405.50
08 Oral hygiene	5.00	29.50	24.25	22.25	9.75	29.50	10.50	80.75	0.00	12.00	5.00	28.25	0.00	43.75	300.50
09 Care of nails	1.25	17.25	13.50	23.00	21.00	19.25	6.50	11.25	3.00	2.75	0.00	2.50	10.00	24.50	155.75
10 Rehabilitation, recreation	256.25	319.25	81.25	66.75	397.50	138.50	98.05	540.75	38.75	55.25	130.25	49.25	31.00	279.29	2,482.09
11 Food, nourishment	377.50	599.50	796.25	1,297.65	404.75	1,304.90	799.30	1,305.83	280.75	699.07	826.25	736.25	497.20	408.00	10,333.20
12 Medications	114.50	300.49	388.50	550.50	164.75	481.11	268.50	519.45	184.00	252.00	280.00	298.25	40.75	456.25	4,299.05
13 Cardinal symptoms	15.50	44.50	29.25	77.25	9.00	59.25	55.50	56.50	83.50	212.25	4.75	21.00	2.75	25.50	696.50
14 Therapeutic measures	0.00	20.00	30.50	184.50	0.00	12.25	0.00	6.00	5.00	20.00	0.00	0.00	0.00	43.00	321.25
15 Urine tests	0.00	7.00	35.50	18.25	0.00	27.70	11.00	0.00	0.00	37.00	0.00	57.25	0.00	0.00	193.70
16 Enema	0.00	17.75	75.50	85.50	62.25	21.75	12.00	3.75	0.00	54.00	0.00	8.00	23.00	0.00	363.50
17 Care of colostomy or ileostomy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	59.00	0.00	0.00	0.00	0.00	0.00	0.00	59.00
18 Associated nursing care function	62.50	275.12	374.71	429.50	191.25	526.00	217.75	448.00	132.00	238.75	120.25	346.93	83.17	308.97	3,754.90
19 Weighing patient	0.00	4.25	3.00	1.75	6.00	0.75	2.75	1.00	0.00	0.00	0.00	0.00	0.00	0.00	19.50
20 Gavaging patient [4]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21 Female procedures	0.00	5.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.50
22 Oxygen therapy	0.00	0.00	24.25	0.00	0.00	21.25	0.00	0.00	0.00	18.50	0.00	0.00	0.00	0.00	64.00
23 Care of critically ill	0.00	0.00	40.00	0.00	0.00	0.00	0.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00	65.00
24 Preparing body after death [4]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25 Miscellaneous	125.75	300.55	677.11	369.00	39.25	125.50	197.25	486.00	99.25	467.75	193.00	314.75	172.00	223.00	3,790.16
Total per home	2,450.00	3,949.91	4,475.82	6,403.09	2,489.75	5,171.21	3,811.95	7,210.28	1,410.25	3,444.07	2,310.75	3,970.88	1,929.12	3,297.51	52,324.59

[1] Indicates multiple person activity time included.
[2] Observation period is 3½ days.
[3] Indicates patient replacements in the home.
[4] No activities observed.

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Table 6.—Average time [1] per occurrence according to nursing care areas for each home in the study

Home number	01	02	03	04	05	06	07	08	09	10	11	12	13	14	Average per Area
Number of patients	06	18	[2] 19	[2] 25	06	[2] 25	12	24	06	18	06	12	06	12	
Nursing care areas															
01 Elimination	7.15	3.47	4.63	4.36	2.54	4.05	5.30	3.01	2.64	2.74	4.36	3.16	6.42	4.21	3.90
02 Catherization	5.49	3.05	6.79	2.96	—	—	8.53	4.28	—	—	3.53	3.49	—	—	4.76
03 Daily care	3.19	3.91	4.13	3.65	2.95	4.73	5.13	2.80	5.69	3.83	4.08	4.04	8.40	3.53	3.82
04 Bathing	25.14	10.72	14.53	16.34	13.34	17.13	18.01	13.78	11.82	16.18	8.52	14.11	19.67	15.02	14.88
05 Bed making	3.16	4.48	5.38	5.30	4.48	3.98	5.71	3.53	5.40	4.60	5.61	6.32	6.02	4.89	4.70
06 Care of skin	3.80	6.53	8.57	6.75	2.84	7.80	3.35	6.67	5.50	5.25	4.89	6.94	4.69	5.67	6.21
07 Care of hair, face	3.89	2.15	4.17	2.81	3.24	4.43	2.27	1.69	4.32	5.67	2.00	3.29	3.28	5.38	3.36
08 Oral hygiene	5.00	1.84	4.04	2.78	1.62	4.21	3.50	1.47	—	2.40	1.67	3.53	—	1.90	2.13
09 Care of nails	1.25	4.31	4.50	7.67	7.00	2.75	3.25	2.25	3.00	1.37	—	2.50	10.00	12.25	4.45
10 Rehabilitation, recreation	6.41	8.40	4.78	5.56	10.74	2.47	3.63	6.51	4.84	3.45	3.30	4.92	2.58	7.98	6.13
11 Food, nourishment	3.93	1.34	1.67	2.60	2.00	1.81	3.15	1.62	1.81	1.06	7.72	2.12	4.01	1.35	1.99
12 Medications	2.01	1.19	1.70	2.27	2.50	1.75	1.51	1.43	2.16	1.05	2.26	1.89	1.27	2.61	1.73
13 Cardinal symptoms	1.55	2.62	1.72	1.68	1.80	3.12	2.22	2.26	4.18	3.72	4.75	1.75	1.37	1.02	248.
14 Therapeutic measures	—	10.00	10.17	6.83	—	6.12	—	3.00	2.50	2.50	—	—	—	4.78	5.84
15 Urine tests	—	1.75	2.73	4.56	—	2.52	1.83	—	—	3.08	—	3.01	—	—	2.81
16 Enema	—	17.75	8.39	7.77	6.22	21.75	6.00	1.87	—	7.71	—	4.00	11.50	—	7.73
17 Care of colostomy or ileostomy	—	—	—	—	—	—	—	6.56	—	—	—	—	—	—	6.56
18 Associated nursing care function	.54	.60	.61	.61	.86	.78	.69	.51	.62	.38	.77	1.02	.59	.58	.63
19 Weighting patient	—	1.42	.75	1.75	1.40	.75	.69	—	—	—	—	—	—	—	1.08
20 Gavaging patient [3]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
21 Female procedures	—	1.83	—	—	—	—	—	—	—	—	—	—	—	—	1.83
22 Oxygen therapy	—	—	12.12	—	—	3.04	—	—	—	3.08	—	—	—	—	4.27
23 Care of critically ill	—	—	10.10	—	—	—	—	—	—	8.33	—	—	—	—	9.29
24 Preparing body after death [3]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
25 Miscellaneous	1.72	.81	1.15	1.32	.98	.95	1.55	1.27	1.08	.73	.95	1.14	2.29	1.14	1.09

[1] Includes multiple person activity time.
[2] Indicates replacement patients in the home.
[3] No activities observed.

Table 7.—Frequency distribution of average hours of care per day received by patients according to geographic area, ambulatory status and nursing need

Average hours	City						Metro						Rural						Total					
	Ambulatory			Nonambulatory			Ambulatory			Nonambulatory			Ambulatory			Nonambulatory			Ambulatory			Nonambulatory		
	Min.	Mod.	Max.	Min.	Mod.	Max.	Min.	Mod.	Max.	Min.	Mod.	Max.	Min.	Mod.	Max.	Min.	Mod.	Max.	Min.	Mod.	Max.	Min.	Mod.	Max.
0.00–0.49	13	—	—	—	—	—	13	2	—	—	1	—	3	2	—	1	—	—	29	4	—	1	1	—
0.50–0.99	13	10	—	—	1	—	13	5	1	—	2	—	5	5	—	—	1	—	31	20	1	—	4	—
1.00–1.49	1	12	—	—	3	—	1	8	—	—	4	2	—	3	—	—	1	—	2	23	—	—	8	2
1.50–1.99	—	3	—	—	4	2	—	3	—	—	4	4	—	—	—	—	1	1	—	6	—	—	9	7
2.00–2.49	—	3	—	—	3	5	1	5	—	—	5	7	—	—	—	—	—	2	1	8	—	—	8	14
2.50–2.99	—	1	—	—	1	2	—	1	—	—	1	—	—	—	—	—	—	2	—	2	—	—	2	4
3.00–3.49	—	—	—	—	—	2	—	—	—	—	—	1	—	—	—	—	—	2	—	—	—	—	—	5
3.50–3.99	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4.00–4.49	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	1	—	—	—	—	—	3
Total	27	29	—	—	12	11	28	24	1	—	17	16	8	10	—	1	3	8	63	63	1	1	32	35

Table 8.—Frequency distribution of average hours of care per day received by patients according to patient population, ambulatory status and nursing need

Average hours	Over 91						Under 91						Total					
	Ambulatory			Nonambulatory			Ambulatory			Nonambulatory			Ambulatory			Nonambulatory		
	Min.	Mod.	Max.	Min.	Mod.	Max.	Min.	Mod.	Max.	Min.	Mod.	Max.	Min.	Mod.	Max.	Min.	Mod.	Max.
0.00–0.49	26	4	—	1	1	—	3	—	—	—	—	—	29	4	—	1	1	—
0.50–0.99	15	16	1	—	3	—	16	4	—	—	1	—	31	20	1	—	4	—
1.00–1.49	2	12	—	—	7	2	—	11	—	—	1	—	2	23	—	—	8	2
1.50–1.99	—	3	—	—	7	7	—	3	—	—	2	—	—	6	—	—	9	7
2.00–2.49	1	4	—	—	5	5	—	4	—	—	3	9	1	8	—	—	8	14
2.50–2.99	—	1	—	—	1	2	—	1	—	—	1	2	—	2	—	—	2	4
3.00–3.49	—	—	—	—	—	1	—	—	—	—	—	4	—	—	—	—	—	5
3.50–3.99	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4.00–4.49	—	—	—	—	—	2	—	—	—	—	—	1	—	—	—	—	—	3
Total	44	40	1	1	24	19	19	23	—	—	8	16	63	63	1	1	32	35

Table 9.—Time difference between overall mean daily care [1] and mean time given in each home to minimum need patients

Home	Number of patients	Range	Mean hours per patient day	Hour difference
01	2	0.31–0.76	0.53	−0.03
02	8	0.26–0.55	0.46	−0.10
03	9	0.40–2.31	0.90	+0.34
04	10	0.16–0.56	0.30	−0.32
05	1	0.98	0.98	+0.42
06	11	0.30–1.06	0.52	−0.04
07	4	0.38–0.78	0.62	+0.06
08	3	0.27–0.46	0.36	−0.20
09	2	0.55–0.99	0.77	+0.21
10	4	0.21–0.55	0.41	−0.15
11	3	0.72–0.95	0.81	+0.25
12	2	0.37–0.50	0.43	−0.13
13	3	0.59–0.71	0.70	+0.14
14	2	0.65–0.82	0.74	+0.18

[1] Overall mean daily care for minimum need patients is 0.56. Number of minimum need patients is 64.

Table 10.—Time difference between overall mean daily care [1] and mean time given in each home to moderate need patients

Home	Number of patients	Range	Mean hours per patient day	Hour difference
01	1	1.45	1.45	+0.09
02	7	0.59–2.10	1.34	−0.02
03	8	0.76–2.13	1.37	+0.01
04	9	0.36–2.63	1.54	+0.18
05	3	1.24–2.66	2.04	+0.68
06	13	0.61–2.56	1.32	−0.04
07	5	1.07–2.26	1.49	+0.13
08	15	0.41–2.26	1.34	−0.02
09	3	0.56–1.48	1.12	−0.24
10	12	0.23–1.58	0.85	−0.51
11	—	—	—	—
12	7	0.74–2.24	1.43	+0.07
13	3	2.31–2.41	2.36	+1.00
14	9	0.62–2.58	1.38	+0.02

[1] Overall mean daily care for moderate need patients is 1.36. Number of moderate need patients is 95.

Table 11.—Time difference between overall mean daily care [1] and mean time given in each home to maximum need patients

Home	Number of patients	Range	Mean hours per patient day	Hour difference
01	3	3.03–3.22	3.02	+0.61
02	3	1.52–2.53	1.99	−0.42
03	2	1.52–2.36	1.94	−0.47
04	6	1.23–4.33	2.47	+0.06
05	2	2.21–2.48	2.35	−0.06
06	1	2.37	2.37	−0.04
07	3	2.27–3.42	2.72	+0.31
08	6	0.96–4.43	2.18	−0.23
09	1	2.01	2.01	−0.40
10	2	1.80–2.84	2.32	−0.09
11	3	2.27–4.00	2.85	+0.44
12	3	2.25–3.05	2.68	+0.27
13	—	—	—	—
14	1	1.81	1.81	−0.60

[1] Overall mean daily care for maximum need patients is 2.41. Number of maximum need patients is 36.

Table 12.—Time difference between overall mean daily care [1] and mean time given in each home to ambulatory patients

Home	Number of patients	Range	Mean hours per patient day	Hour difference
01	3	0.31–1.45	0.84	−0.06
02	12	0.26–1.31	0.65	−0.25
03	15	0.40–2.31	1.15	+0.25
04	14	0.16–2.23	0.55	−0.35
05	4	0.98–2.66	1.78	+0.88
06	20	0.30–2.56	0.84	−0.06
07	8	0.38–2.26	1.04	+0.14
08	12	0.27–1.95	0.92	+0.02
09	4	0.55–1.31	0.85	−0.05
10	12	0.21–1.22	0.66	−0.24
11	3	0.72–0.95	0.81	−0.09
12	6	0.37–1.79	1.04	+0.14
13	4	0.71–2.41	1.13	+0.23
14	10	0.62–2.21	1.13	+0.23

[1] Overall mean daily care for ambulatory patients is 0.90. Number of ambulatory patients is 127.

Table 13.—Time difference between overall mean daily care [1] and mean time given in each home to non-ambulatory patients

Home	Number of patients	Range	Mean hours per patient day	Hour difference
01	3	2.80–3.22	3.02	+0.99
02	6	1.46–2.53	1.87	−0.16
03	4	0.76–2.36	1.42	−0.61
04	11	0.94–4.33	2.18	+0.15
05	2	2.21–2.48	2.35	+0.32
06	5	1.21–2.37	1.70	−0.33
07	4	1.56–3.42	2.43	+0.40
08	12	0.41–4.43	1.94	−0.09
09	2	1.48–2.01	1.74	−0.29
10	6	0.41–2.84	1.42	−0.61
11	3	2.27–4.00	2.85	+0.82
12	6	0.74–3.05	2.11	+0.08
13	2	2.31–2.37	2.34	+0.31
14	2	1.81–2.58	2.20	+0.17

[1] Overall mean daily care for nonambulatory patients is 2.03. Number of nonambulatory patients is 68.

Table 14.—Total number of hours [1] given to study patients for 3½-day study period by level of personnel according to geographic area and patient population of the homes

Personnel level	Geographic area				Patient population	
	City	Metro	Rural	Total	Under 91	Over 91
RN	18.61	27.26	11.02	56.89	28.79	28.10
LPN	41.06	48.66	17.88	107.60	46.79	60.81
Aide	248.02	294.18	101.72	643.92	265.24	378.68
Other	29.00	28.54	6.13	63.67	20.35	43.32
Total	336.69	398.64	136.75	872.08	361.17	510.91

[1] Includes multiple person activity time.

Table 15.—Total number of hours on duty [1] for 3½-day study period by level of personnel according to geographic area and patient population of the homes

Personnel level	Geographic area				Patient population	
	City	Metro	Rural	Total	Under 91	Over 91
RN	677.00	1,165.0	532.00	2,374.00	918.00	1,456.00
LPN	971.00	1,177.0	328.00	2,476.00	848.00	1,628.00
Aide	3,273.75	4,926.0	2,352.75	10,552.50	3,385.25	7,167.25
Total	4,921.75	7,268.0	3,212.75	15,402.50	5,151.25	10,251.25

[1] Only the time of those personnel involved with the study patients are included.

Table 16.—Percent[1] of time for personnel levels by shifts in individual homes

Home	Shift	RN	LPN	Aide	Other	Total
	1st	3.94	18.70	27.38	5.55	55.57
01	2nd	2.97	—	23.93	.33	27.23
	3rd	.59	8.51	8.10	—	17.20
Total		7.50	27.21	59.41	5.88	100.00
	1st	2.56	1.85	40.32	10.25	54.98
02	2nd	2.01	6.15	18.27	2.12	28.55
	3rd	.01	4.90	11.56	—	16.47
Total		4.58	12.90	70.15	12.37	100.00
	1st	1.41	7.05	40.18	4.54	53.18
03	2nd	1.59	3.24	19.27	1.59	25.69
	3rd	.89	4.38	15.86	—	21.13
Total		3.89	14.67	75.31	6.13	100.00
	1st	1.77	10.37	39.33	3.54	55.01
04	2nd	3.55	2.97	22.49	1.84	30.85
	3rd	1.26	2.42	10.37	.09	14.14
Total		6.58	15.76	72.19	5.47	100.00
	1st	4.03	8.25	38.38	2.85	53.51
05	2nd	3.51	—	18.85	8.41	30.77
	3rd	7.20	—	8.52	—	15.72
Total		14.74	8.25	65.75	11.26	100.00
	1st	.55	7.78	29.66	9.80	47.79
06	2nd	1.09	5.82	21.78	3.56	32.25
	3rd	1.10	3.83	15.01	.02	19.96
Total		2.74	17.43	66.45	13.38	100.00
	1st	4.11	.62	46.93	1.55	53.21
07	2nd	3.98	—	29.05	.52	33.55
	3rd	4.19	.03	9.02	—	13.24
Total		12.28	.65	85.00	2.07	100.00
	1st	2.72	3.68	35.48	5.78	47.66
08	2nd	1.35	2.59	30.50	3.02	37.46
	3rd	1.31	1.02	12.50	.05	14.88
Total		5.38	7.29	78.48	8.85	100.00
	1st	7.28	.53	36.68	4.22	48.71
09	2nd	4.04	4.86	22.48	4.24	35.62
	3rd	1.37	9.48	4.82	—	15.67
Total		12.69	14.87	63.98	8.46	100.00
	1st	4.84	1.31	47.35	3.21	56.71
10	2nd	3.66	.04	23.60	1.34	28.64
	3rd	2.52	—	12.13	—	14.65
Total		11.02	1.35	83.08	4.55	100.00
	1st	3.99	2.05	47.73	.06	53.83
11	2nd	.26	8.71	24.59	2.82	36.38
	3rd	—	4.81	4.98	—	9.79
Total		4.25	15.57	77.30	2.88	100.00
	1st	2.63	.88	46.34	3.31	53.16
12	2nd	.74	4.87	24.34	1.20	31.15
	3rd	—	5.16	10.53	—	15.69
Total		3.37	10.91	81.21	4.51	100.00
	1st	4.17	2.28	47.89	2.02	56.36
13	2nd	1.31	1.25	25.29	.64	28.49
	3rd	—	12.69	2.46	—	15.15
Total		5.48	16.22	75.64	2.66	100.00
	1st	3.08	6.74	42.60	6.86	59.28
14	2nd	1.12	6.78	15.54	2.28	25.72
	3rd	1.30	4.52	8.88	—	15.00
Total		5.80	18.04	67.02	9.14	100.00

[1] The time factor used for determining the percentages is only the time given by personnel to observed patients.

Table 17.—Percent of time for personnel levels in combined total of homes according to shifts

Shift	RN	LPN	Aide	Other	Shift total
First	2.87	5.36	39.83	4.95	53.01
Second	2.15	3.41	23.27	2.33	31.16
Third	1.50	3.57	10.74	.02	15.83
Personnel total	6.52	12.34	73.84	7.30	100.00

[1] The time factor used for determining the percentages is only the time given by personnel to observed patients.

Table 18.—Percent of time [1] for personnel levels by shifts according to geographic area

Geographic area	Personnel level: Registered nurse, Shift			Lic. practical nurse, Shift			Aide, Shift			Other, Shift			Total
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd	
City	2.4	1.8	1.3	3.7	4.8	3.7	40.4	22.0	11.3	6.6	2.0	—	100.0
Metro	2.7	2.4	1.7	6.3	2.6	3.4	38.8	24.1	10.9	4.2	2.9	.1	100.0
Rural	4.3	2.5	1.2	6.7	2.5	3.9	41.5	24.0	8.9	3.0	1.5	—	100.0
All homes	2.9	2.1	1.5	5.4	3.4	3.6	39.8	23.3	10.7	5.0	2.3	.1	100.0

[1] The time factor used for determining the percentages is only the time given to observed patients.

Table 19.—Percent of time [1] for personnel levels by shifts according to patient population

Patient population	Personnel level: Registered nurse, Shift			Lic. practical nurse, Shift			Aide, Shift			Other, Shift			Total
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd	
Under 91	3.9	2.1	2.0	4.8	3.3	4.9	42.5	23.1	7.8	3.3	2.3	—	100.0
Over 91	2.2	2.1	1.2	5.8	3.5	2.7	37.9	23.4	12.8	6.1	2.3	<.1	100.0
All homes	2.9	2.1	1.5	5.4	3.4	3.6	39.8	23.3	10.7	5.0	2.3	<.1	100.0

[1] The time factor used for determining the percentages is only the time given to observed patients.

Table 20.—Percent of nursing service commissions and omissions by personnel level for each home in the study and for combined total of homes

Home number	Commissions Omissions	Personnel level RN	LPN	Aide	Other	Total home
01	Commissions	16.89	25.54	37.52	4.82	84.77
	Omissions	2.54	4.93	7.57	0.19	15.23
02	Commissions	5.74	17.72	54.67	6.17	84.30
	Omissions	1.19	5.80	8.40	0.31	15.70
03	Commissions	4.58	16.22	58.30	2.46	81.56
	Omissions	1.13	4.54	12.69	0.08	18.44
04	Commissions	6.67	23.19	46.19	4.06	80.11
	Omissions	1.69	5.45	12.31	0.44	19.89
05	Commissions	17.19	10.43	53.62	0.81	82.05
	Omissions	3.25	1.50	13.18	0.02	17.95
06	Commissions	3.02	21.94	49.17	7.16	81.29
	Omissions	1.00	8.64	8.14	0.92	18.69
07	Commissions	19.49	0.24	54.27	0.87	74.87
	Omissions	5.87	0.14	19.02	0.10	25.13
08	Commissions	7.84	13.15	55.80	2.49	79.28
	Omissions	1.01	6.03	13.53	0.15	20.72
09	Commissions	16.23	16.89	43.62	3.53	80.27
	Omissions	5.33	4.65	9.23	0.52	19.73
10	Commissions	19.32	2.68	53.73	3.08	78.81
	Omissions	6.01	1.89	12.98	0.31	21.19
11	Commissions	8.20	26.98	48.18	0.31	83.67
	Omissions	2.34	8.39	5.60	0.00	16.33
12	Commissions	3.95	14.86	54.94	2.82	76.57
	Omissions	3.05	5.97	14.16	0.25	23.43
13	Commissions	10.05	16.96	51.74	2.29	81.04
	Omissions	2.26	4.88	11.76	0.06	18.96
14	Commissions	7.28	24.81	48.04	1.35	18.48
	Omissions	1.25	7.64	9.59	0.42	18.52
Total all homes	Commissions	9.20	16.24	51.64	3.32	80.40
	Omissions	2.38	5.25	11.70	0.28	19.60

Table 21.—The number of commissions by personnel level and patient care category[1] for each home in the study

Personnel level	Patient care category	Home number 01	02	03	04	05	06	07	08	09	10	11	12	13	14	Total
RN	A	247	184	158	373	457	161	493	685	215	622	106	100	127	247	4,175
	B	164	172	92	178	218	79	257	178	141	235	84	79	92	166	2,135
	C	95	106	112	257	201	80	230	350	141	569	31	52	53	148	2,425
	D	282	180	126	262	232	98	739	256	188	536	171	151	48	133	3,402
	E	4	10	2	1	24	7	4	1	6	20	0	0	26	6	111
Total		792	652	490	1,071	1,132	425	1,723	1,470	691	1,982	392	382	346	700	12,248
LPN	A	461	715	545	1,224	179	992	7	648	223	48	366	496	319	822	7,045
	B	283	483	332	640	171	745	5	539	126	54	281	318	104	443	4,524
	C	141	353	351	952	61	460	0	303	175	31	213	219	97	580	3,936
	D	229	414	466	898	258	809	8	968	186	136	414	384	54	523	5,747
	E	84	49	41	12	18	79	1	8	9	6	16	21	10	19	373
Total		1,198	2,014	1,735	3,726	687	3,085	21	2,466	719	275	1,290	1,438	584	2,387	21,625
Aide	A	874	2,634	2,481	3,408	1,639	2,853	2,424	5,218	785	2,205	1,080	2,438	917	2,007	30,963
	B	463	1,640	1,805	2,204	1,006	2,030	1,184	2,569	514	1,523	598	1,335	437	1,371	18,679
	C	177	1,032	905	1,104	497	901	741	1,823	318	1,039	414	962	259	775	10,947
	D	106	453	561	334	122	340	197	410	96	404	119	292	14	143	3,591
	E	140	455	485	371	267	789	251	439	144	340	93	289	155	326	4,544
Total		1,760	6,214	6,237	7,421	3,531	6,913	4,797	10,459	1,857	5,511	2,304	5,316	1,782	4,622	68,724
Other	A	93	245	101	300	8	397	46	194	57	155	2	131	24	54	1,807
	B	70	256	70	207	27	327	23	154	60	77	9	81	31	49	1,441
	C	33	41	66	18	5	127	2	12	9	6	2	12	12	16	361
	D	13	25	7	38	0	14	6	35	8	13	0	37	0	0	196
	E	17	135	19	90	13	142	0	72	16	65	2	12	12	11	606
Total		226	702	263	653	53	1,007	77	467	150	316	15	273	79	130	4,411
Home total		3,976	9,582	8,725	12,871	5,403	11,430	6,618	14,862	3,417	8,084	4,001	7,409	2,791	7,839	107,008

[1] Patient Care Categories: A—Physical Needs, Care and Comfort
B—Psychological and Mental Needs
C—Cleanliness of Home and Equipment
D—Safe, Aseptic Techniques
E—Rehabilitation and Recreation

Table 22.—The number of omissions by personnel level and patient care category[1] for each home in the study

Personnel level	Patient care category	Home number 01	02	03	04	05	06	07	08	09	10	11	12	13	14	Total
RN	A	9	10	14	27	84	22	58	6	12	46	4	14	8	7	321
	B	5	2	3	35	25	5	48	10	3	47	1	48	5	5	242
	C	0	1	5	0	0	0	0	0	3	0	0	2	0	1	12
	D	105	122	99	209	103	111	413	174	209	524	107	231	65	107	2,579
	E	0	0	0	1	2	3	0	0	0	0	0	0	0	0	6
Total		119	135	121	272	214	141	519	190	227	617	112	295	78	120	3,160
LPN	A	106	152	59	49	14	99	0	42	27	21	18	79	43	25	734
	B	17	63	34	79	3	45	2	35	19	17	13	37	30	48	442
	C	4	14	2	12	2	10	0	2	9	0	6	12	3	3	79
	D	102	409	391	734	79	1,058	10	1,050	143	156	363	429	90	659	5,673
	E	2	21	0	1	1	2	0	0	0	0	1	21	2	0	51
Total		231	659	486	875	99	1,214	12	1,129	198	194	401	578	168	735	6,979
Aide	A	214	373	473	866	505	538	874	1,229	167	484	114	612	191	391	7,031
	B	25	143	148	407	130	85	257	397	71	162	39	292	91	96	2,343
	C	10	24	32	75	32	52	33	123	42	83	19	65	7	12	609
	D	104	369	679	595	145	442	385	670	113	599	91	381	103	423	5,099
	E	2	46	25	34	56	27	132	118	0	3	5	20	13	1	482
Total		355	955	1,357	1,977	868	1,144	1,681	2,537	393	1,331	268	1,370	405	923	15,564
Other	A	5	4	0	3	1	26	0	8	12	5	0	9	0	1	74
	B	0	2	0	29	0	7	1	2	1	7	0	8	0	0	57
	C	0	1	2	0	0	4	1	0	0	0	0	0	1	0	9
	D	4	29	5	34	0	72	6	17	9	20	0	7	1	3	207
	E	0	0	1	5	0	20	1	2	0	0	0	0	0	0	29
Total		9	36	8	71	1	129	9	29	22	32	0	24	2	4	376
Home total		714	1,785	1,972	3,195	4,377	2,628	4,849	3,885	4,725	2,174	781	2,267	653	1,782	26,079

[1] Patient Care Categories: A—Physical Needs, Care and Comfort
B—Psychological and Mental Needs
C—Cleanliness of Home and Equipment
D—Safe, Aseptic Techniques
E—Rehabilitation and Recreation

Table 23.—Nursing quality in patient care categories expressed as percentage of total acts [1] for each level of personnel in combined total of homes

Personnel level	Acts	Patient care category A	B	C	D	E	All categories
RN	[2] C	92.9	89.8	99.5	56.9	94.9	79.5
	[3] O	7.1	10.2	0.5	43.1	5.1	20.5
LPN	C	90.6	91.1	98.0	50.3	88.0	75.6
	O	9.4	8.9	2.0	49.7	12.0	24.4
Aide	C	81.5	88.8	94.7	41.3	90.4	81.5
	O	18.5	11.2	5.3	58.7	9.6	18.5
Other	C	96.0	96.2	97.6	48.6	95.4	92.1
	O	4.0	3.8	2.4	51.4	4.6	7.9
All personnel	C	84.4	89.6	96.1	48.8	90.8	80.4
	O	15.6	10.4	3.9	51.2	9.2	19.6

[1] Total acts include commissions and omissions.
[2] Commissions.
[3] Omissions.

Table 24.—Average time [1] per day for administering medications per patient for each home in the study

Home number	Number of patients	Total 3½ days	Average per day per patient
01	06	114.50	5.45
02	18	300.49	4.77
03	[2] 19	388.50	6.17
04	[2] 25	550.50	6.55
05	06	164.75	7.85
06	[2] 25	481.11	5.73
07	12	268.50	6.39
08	24	519.45	6.18
09	06	184.00	8.76
10	18	252.00	4.00
11	06	280.00	13.33
12	12	298.25	7.10
13	06	40.75	1.94
14	12	456.25	10.86
Total	195	4,299.05	6.40

[1] Figures indicate number of minutes.
[2] Indicates replacement patients.

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Table 25.—Average time [1] per day of rehabilitative and recreational care per patient for each home in the study

Home number	Number of patients	Total 3½ days	Average per day per patient
01	06	256.25	12.20
02	18	319.25	5.07
03	[2] 19	81.25	1.29
04	[2] 25	66.75	0.79
05	06	397.50	18.93
06	[2] 25	138.50	1.65
07	12	98.05	2.33
08	24	540.75	6.44
09	06	38.75	1.85
10	18	55.25	0.88
11	06	130.25	6.20
12	12	49.25	1.17
13	06	31.00	1.48
14	12	279.29	6.65
Total	195	2,482.09	3.69

[1] Figures indicate number of minutes.
[2] Indicates replacement patients.

Table 26.—Average time [1] per day for administering medications per patient according to geographic area and patient population

	Geographic area City	Metro	Rural	Patient population Under 91	Over 91
Number of patients	[2] 79	[2] 86	30	66	129
Total 3½ days	1,804.60	1,847.95	646.50	1,870.00	2,492.05
Average per day per patient	6.61	6.29	6.16	7.82	5.65

[1] Figures indicate number of minutes.
[2] Indicates replacement patients.

Table 27.—Average time [1] per day of rehabilitative and recreational care per patient according to geographic area and patient population

	Geographic area City	Metro	Rural	Patient population Under 91	Over 91
Number of patients	[2] 79	[2] 86	30	66	129
Total 3½ days	884.34	1,156.00	441.75	1,280.34	1,201.75
Average per day per patient	3.24	3.93	4.21	5.54	2.73

[1] Figures indicate number of minutes.
[2] Indicates replacement patients.

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